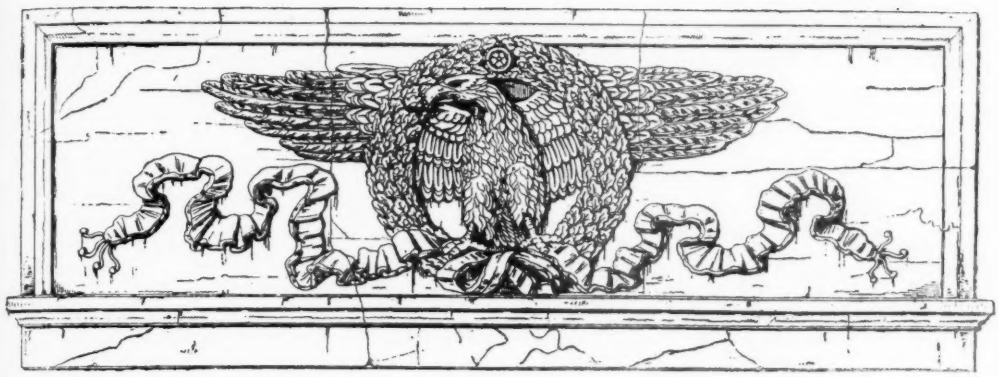

THE DESIGN AND CONSTRUCTION OF BUILDINGS FOR INDUSTRIAL PURPOSES.

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THE subject-matter of my Paper to-night could readily be divided under many heads, any one of which might be treated so as to occupy the whole time at my disposal, and again each of these heads be subdivided and enlarged upon. I mention this because I can only travel from point to point, hoping that I shall single out the main details of interest that arise in each, and thus review my whole subject in such a way as to be fairly comprehensive and complete. Possibly, and indeed I must, touch upon very elementary subjects, and even may not bring any new matter before you; but such as my Paper is, it represents what I am finding necessary to keep always in mind, so that as circumstances arise I may be ready to meet, apply, and adapt them to the conditions of building as we now understand it.

To the factory architect are offered many great and absorbing problems, and only in the case of prohibition through cost are we ever supposed to be confronted with the impossible. Somehow or other we are called upon to meet various conditions and develop them upon the lines required for the undertakings we are engaged upon; and if we accomplish this, as a rule the ultimate forms are left to us to deal with without restraint.

The middle of the nineteenth century probably saw the greatest activity in factory undertakings. These buildings throughout the United Kingdom are familiar to everyone. All much of the same type of design, somewhat dull and uninteresting, but always of a solid, heavy type, as reflecting the character and solidity of the businesses carried on therein, they stand to this day, still performing useful work. As a rule they are constructed of local material, but in none of them did it appear as though any very great thought had been expended upon the convenience of the employees.

What a change there is between these factories and those which have been erected during the last twenty to thirty years! Throughout England there are to be seen undertakings erected in this period which show that the capitalists have tried to place their people in buildings and surroundings that must influence, and for the better, the lives and ideals of their workpeople. No longer are the factories dark, insanitary, draughty, and barn-like structures; but bright, open, thoroughly ventilated and warmed, and with administrative conveniences adding materially to the comfort and well-being of the employees. In addition to this, social clubs and institute buildings form almost a necessary part of the present-day factory.

The most marked change between the early factories of the nineteenth century and the present time is not, however, only due to the better housing of the employees, but to an entirely different mode

of construction and material employed in the buildings themselves. The older factories were of small spans as regards covered area, with wooden roof principals and floor beams, and with more or less adequate fire-escape arrangements. Timber was the usual, and practically the only, material to bridge large spans; bricks and mortar the usual wall construction; slung floors were usually of timber; special beams cast-iron, columns of the same metal. With the introduction of iron—and, at a later date, steel—spans increased rapidly, until to-day they are almost unlimited. Floor girders and joists, wall stancheons and roofs are of steel. But perhaps the greatest changes in modern factory construction have been brought about by the introduction of steel and concrete, used together for walls, roofs and floors, and combined in such a way that almost any peculiar form of building necessary to a certain process can readily be carried out.

I hardly think my subject entitles me to consider the Works Site, but I should like to say a word on the question of the width of roadways dividing the factory buildings. In so many factories these are to be found of varying widths from 26 feet to 40 feet. Such spaces seem to me totally inadequate for present-day requirements, especially where sidings run through these roadways. There are undoubtedly occasions when as much as 200 feet between factories is not too much. The average works cannot face the loss in acreage that would be the result from a width of 200 feet, but I would like to fix a minimum of 100 feet; and should this space at first not be wholly occupied by sidings, power mains, etc., the space between the paved roads can be sown with grass until the time arrives that this space is demanded for traffic, or other works equipment; and we cannot overestimate the value of these wide roads as fire screens.

The various buildings comprising the usual factory undertakings may be roughly stated as follows:—Office and Administrative Department; Raw Goods Stores; General Factory Buildings; Warehouses for Finished Goods; Power Plant Buildings, including Boiler House, etc.; Attendant and By-product Buildings.

Our aim in the planning of such a factory must be the arrangement of these various buildings, and the departments comprised in each, in such order as to ensure the passage of the raw materials, entering from one, two, or more sources of supply, through the successive shops until the goods reach their final state, and are stored in the warehouse, for distribution to the customer. This passage of the articles under manufacture must, if possible, be arranged without re-entering or re-crossing departments through which in course of manufacture they have previously passed. Such a process in many cases means a simple arrangement for passing the goods from one side of the building to another, or from the top of a many-storeyed building to the bottom, but in factories where the goods are partly manufactured or handled in the various shops and completed or assembled in others, the scheming to bring each department successively within touch of the other requires care and thought in planning; and for this purpose it is essential for the architect to make himself generally acquainted with the process of manufacture in each case.

I propose now to offer one or two observations on the planning of some of the departments given in my list, and then to review generally the forms of construction applicable to the factory. We could, in discussing these buildings, cover a ground as varied as the commercial enterprise of this country, but you will readily understand in this again I must generalise my remarks.

It would serve no useful purpose to consider the Office part of the factory buildings to-night. From the office which is often formed out of the building contractor's or clerk of works' office, works temporary sheds, to those offices costing thousands of pounds, standing back in gardens of their own, represents a field of architectural activity most varied and interesting, the latter conditions showing that desire on the part of the directors to house their staffs in surroundings that partake of the success and virility of the business they are engaged in.

The Administrative Department must not be confused with the General Office just mentioned, but is a departmental office concerned in the management of the factory itself, and generally includes

the following :—Time and Wage Office ; Cloak-rooms ; Bath-rooms and Latrines ; Clothes Drying-room ; Rest Room ; Surgery ; Manager's and Clerks' Offices. This block must be placed at a point most convenient to the factory building it serves, and in such a situation as to allow of the rapid distribution of the workpeople to the several departments in the building. Such position may be either the corner, the side, or in the centre, and as far as possible arranged so that the workpeople can reach their own particular work by galleries or passages, without traversing the floors of a shop in which they are not engaged. The relative position of the Administrative block with the Works entrance is not of importance, except that, where possible, sidings should not have to be crossed by the employees.

In factories made up of a large number of large isolated buildings, or in single factories covering a considerable area of ground, it is desirable to divide and duplicate the Administrative Department. In plan, it should include a large Assembly Vestibule, out of which opens the Wage and Time-checking Room. This vestibule provides proper accommodation for the workpeople to congregate under cover during the few minutes taken in signing on, and on leaving the factory, and also during the time when the wages are being paid. Opening from this vestibule are the cloak-rooms, with lockers for each individual employee. In factories where the hands number some hundreds, an Attendant's Office will be necessary, and this should be placed in full command of the cloak-room, and other offices opening from same. The duty of this attendant will be to check the times in and out during the working hours, and be generally responsible for the cleanliness of this department. If space is available, each line of lockers in the cloak-room should be set out in such a way that the men and girls passing into the works can dispose of their cloaks without blocking up any of the gangways, and as soon as the whole number of workpeople have passed into the factory each gangway of lockers should be closed in by collapsible gates under the control of the attendant.

The Latrine Buildings should have the walls of white-glazed bricks, and partitions raised some inches from the ground, and to a height of 6 feet or 6 feet 6 inches ; plain unmoulded doors ; tiled floors laid with proper falls to gulleys, so that the buildings can be thoroughly cleansed with a hose pipe. Opening from the cloak-room should be the bath-rooms, these formed usually as shower baths, with simple arrangement for hot and cold water supply, the shower enclosed in a small partition off which is a small dressing space. In cases where the process of manufacture requires it, the usual cast-iron bath is arranged for. Again adjoining the cloak-room should be a drying-room, with glazed brick walls and concrete floor and ceiling, the latter having slung rods, with a number of hooks on which wet garments are hung as soon as the employees have entered the works. The room should have a steam battery and fan to circulate hot air through the clothes for the purpose of drying them. A very small room, and small power motor, will enable the attendant to dry a considerable number of clothes during the time the workpeople are engaged in the factory.

The style of Manager's Office (and, if necessary, the Clerks' Office) will depend entirely on the system of departmental management of the particular factory. These rooms where possible should be placed in such a position as to overlook the factory.

There are still two departments required to complete this block—namely, the First Aid Surgery and the Rest Room. For the Surgery a small room is suitable, with tiled walls, tiled floor, having small operating table, couch, medicine chest, antiseptic ointments, bandages, plain splints, with small sink, hot and cold water, electric radiator and electric kettle. Although such a room may lie idle for the greater part of the year, most employers have been only too glad to have such facilities in case of small or serious accidents. As a rule most large works have a properly drilled and equipped ambulance brigade, the members of which are quite capable of attending to accidents until the medical officer can be called to the site. In large works this Surgery would be attached both to the male and female side of the Administrative Block.

The other so-named luxury is the Rest Room. These rooms are required only where girl labour is

employed, and should be as unlike any part of the factory building as possible. They are used by the workers in cases of faintness and sickness, the girls being granted permission on application to the forewoman of their department, and here are permitted to spend an hour in comfortable, quiet, and restful surroundings. The room is under the supervision of a matron attendant.

Other details in planning I shall not at present refer to, but shall assume that by now we have decided upon the class of building that will be required for our undertaking, the general disposition of the buildings, number and height of the storeyed buildings, weights to be carried, and general character of the machinery, and that now we must decide which of the several and usual forms of present-day construction will best suit our requirements.

The following are offered to us for choice :—Brick structure wholly, with wood or cement floors, and with wooden or steel roofs ; steel and brick composite buildings, with wooden or slung concrete floors, steel or wooden roofs ; steel structure ; reinforced-concrete structure.

Some twenty to thirty years ago the forms of composite buildings varied very considerably, and were designed in both iron and steel in peculiar forms for each undertaking. Gradually out of this somewhat chaotic state the designs became more uniform ; joists, girders, and roof principals were catalogued, and almost all forms of major items in the buildings were carried out in a generally recognised design. Girder connections, seatings, and brackets have been further standardised, and perhaps we are now too well supplied by manufacturers and constructional engineers with catalogues of these details, which, whilst forming a constant and convenient reference, are inclined to check research and enterprise in the way of new forms. Be that as it may, the result has been to reduce cost and expedite the work. It is safe to say that the composite building is the one most universally in use, and offers a very varied field for all classes of factories, both of heavy and light construction, and is capable of dealing satisfactorily with the greatest of all former troubles—namely, large spans and heavy loads.

There is, however, another and a newer form of construction that is claiming and demanding very serious consideration at our hands, and that is reinforced concrete. The earlier promoters, for reasons best known to themselves, desired to treat the architect as neither knowing nor wishing to know anything of this science of building. That it is a wonderful science is undoubted, and its ready acceptance on the Continent and in America has enabled many regions of the world to be brought almost into the heart of commercial life. To my mind, bridge construction, riverside piers, jetties, retaining walls, silo buildings, cooling towers, culverts, and the more peculiar forms, are the lines upon which reinforced concrete finds its particular outlet. One hesitates to accept this form of construction for the average factory, on account of the many changes that are constantly being made, especially as regards machinery. These changes invariably lead to the cutting of floors, rearrangement of loads and points of support, and one cannot get away from the feeling that during these changes the cutting of a main member might possibly mean a partial collapse.

The ideal factory for reinforced concrete is one made up of units of space and loads as regards floor area and machinery, each floor being set out without much possibility of change. Fire-resisting, temperate, vermin-proof, these buildings form excellent stores, and where carriage of large and heavy girders to the works site is a big item of expenditure, a considerable saving can be made by this form of construction. As regards the exterior design of a reinforced-concrete factory building, I would suggest that it be of a block type, straight piers, beams and lintols, with the cornices and strings on a simple, bold line.

In the construction of the modern factory, we consider the walls only as a means of enclosing a covered space to protect it from the weather, and possibly to give some support to more or less important floors and details of plant. It is quite true that in buildings of no great height and of no great storage weight, the walls as piers between the windows still perform the office of weight carriers ; but as floor loads have increased, and spans and openings widened, the concentration of the

load on to the brickwork between the windows has been too great to be safely carried by this material, without a considerable increase in the size of these piers, and the consequent loss in floor space and window area. This concentration of load on to the piers brought about the substitution of the steel stancheon as the weight carrier, and at a later date the building up of a skeleton steel structure of outer and inner stancheons, floor girders and joists, with steel window lintols and sills. Such a structure gives a maximum strength, in a minimum of space occupied by the supports, and has also a great advantage in quick erection, and of carrying strong and suitable attachments for plant or load carriers. These skeleton structures are afterwards clothed with a skin of brickwork or concrete between the main uprights, and in other ways covered to suit the wishes of the proprietor.

It is, of course, not every factory where the loads on the outer wall necessitate anything more than the ordinary brickwork, and in the matter of appearance there is a great deal to be said for those factories where the outer walls are still carrying their share of the load, and represent a reasonable proportion of solid brickwork to window opening. The appearance of a steel structure very often represents nothing but one continuous sheet of glass divided by the widths of the stancheons themselves.

Sometimes the steel structure stops short at the first or second storey, but I prefer to carry up the outer stancheon to the roof, as an additional means of stiffening the whole structure against wind pressure. Such buildings are carried to spans of varying widths up to 150 feet, and to heights from 50 to 80 feet, the larger dimensions being very familiar to us all as required by large steel or iron works, bridge building, engineering, ordnance and foundry undertakings; I propose later to describe one more particularly, with the attendant departments.

The construction and finish of factory floors is a matter requiring care and experience. To-day we have constantly brought to our notice different forms of floor construction—fire-resisting blocks, patent joists, etc., but I believe most of us prefer to use the ordinary steel joist and concrete-filled floor, and, in special cases, girders with concrete filling, boxed out and strengthened with mesh metal. It is unnecessary to state that the weights of the loads to be carried must be most carefully calculated, so that there will be no straining of the structure, and the surfaces of the floors must be properly prepared to take the finishing necessary for the special class of factory we are dealing with at the moment. These finishings may be roughly taken as follows:—Engine and Power Stations, hard tile; Boiler Houses, blue brick; Chemical Factories, blue acid-proof brick, with acid-proof asphalt; Factories, granolithic paving, asphalt, and wood blocks.

For a large type of engineering works, creosoted blocks of redwood, 12 inches by 7 inches by 3 inches thick, laid on a 6-inch bed of concrete and 6-inch to 9-inch bed of ballast, the blocks afterwards grouted in cement, form an excellent floor, presenting a yielding surface to falling fittings, comparatively speaking cheap, and warm to the feet of the workers. A more expensive floor for the same class of building is formed with the usual street paving wood blocks, 9 inches by 3 inches by 4 inches thick. For a factory where more delicate manufacture is carried on there is nothing at the present time that approaches maple wood block. Trucking and hard wear come alike to this excellent timber. These blocks must be laid when the shops and the concrete are thoroughly dry, as it is a timber that will absorb any amount of moisture, and will then expand to such an extent as to lift itself from the concrete floor floating some three to four feet—that is, if held tight at the walls. I have seen these blocks expand to such an extent that they have pushed out the door sills with the door frames. The life of such a floor seems to be endless, and nothing seems to disturb it or cause the grain to rise and give the surface an appearance of roughness. Instead of maple wood block, boards of the same timber, laid and nailed to fillets embedded in the concrete, form an excellent floor.

Concrete floating, granolithic paving, and tiling, all have their various uses in one or other part of the factory, but whatever be the material used, it should be of the best quality—if timber, well seasoned—and laid in a workmanlike manner, as hardly any part of the factory is subject to the same

wear as the floor, and therefore causing a greater inconvenience if it should break up and require renewing.

The roof of a factory is, perhaps, the most interesting detail we have to consider. I do not propose to discuss the different types of roof principals—these have become practically standardised—but I shall refer to one or two peculiar forms that I have often found it necessary to employ. When called upon to erect a factory in a district with which I am not familiar, I generally apply to the nearest Observatory for the records of winds and gales, also for particulars of rainfall. Such information is most readily given, and one has then the satisfaction of calculating all details on a sound local basis. In connection with these Observatory details, on two occasions after the factories were completed the Observatories were good enough to write stating that gales had just occurred greatly in excess of any previous record; and therefore, in view of the increased spans asked for, it is desirable that no risk should be run when calculating the strains and stresses for this or any other part of the structure. One must admit that at times roofs and girders give the impression of being extremely weighty, and therefore costly, and perhaps it may be only two or three times in the year that they are strained up to their full load. The roof of the average two or more storeyed building is usually a single span of the ordinary type of principal suitable to the width, with probably a certain proportion of skylight area, and in some cases peculiar details as regards louvre ventilation.

The lighting of large one-storey areas presents more details of interest. The north and east light is the steadiest for factory buildings; and the usual type of roof is that known as the Weaver roof, in which the northerly side is wholly glazed, and the southerly side slated or covered in some other form. The angle of the north pitch is a matter requiring careful adjustment and is governed by the situation of the works, either at home or abroad. In extremely sunny countries the pitch should be about 85°. In England, and in dull climates, and on the western slope of a valley, the angle with the horizontal must be reduced to about 60°. The slated side will be at a pitch of about one-third the span. This angle of 60° may require to be varied in factories where an unusual amount of ventilation is required. As a rule this ventilation is provided in the form of open louvres framed in the ridge of each roof, and running the whole length from parapet to parapet. These louvres project some 2 feet to 5 feet above the ridge. If, then, the pitch of the glazed side is too upright, the outlook from the floor or working level in the shop, and farthest from the skylight, is into this line of louvres, with the result that the shop is unnecessarily darkened. In such a case the pitch of the glazed side of the roof should be reduced, and its exact angle fixed by a trial by diagram. If the shop is one requiring not only ventilation but a very considerable amount of light, the slope of the louvre roofs should also be glazed. The span of these Weaver type roofs varies from 25 feet to 35 feet. It is worth our while for a moment to consider to what maximum limit of span this type of roof may be taken, so as to be economical as regards construction, and satisfactory as regards lighting the shop. Personally, I have no hesitation in taking the span up to 33 feet, but I should call this the extreme limit, and the result in both cases will be quite satisfactory. I have, however, built these roofs to a span of 50 feet for the purpose of housing special machines, and in that case found that although the roof principal members were painted white, and the whole of the north side glazed, the shop was not well lighted, and the saving in cost negligible.

So far we have dealt with the span only of this type of roof. The craving amongst manufacturers for large floor spaces with as few supports as possible brings us to the problem of what cross spacing is required to economically carry these roofs. Again, 30 feet to 33 feet seems to me the economical limit; beyond that special and costly girdering is necessary and is usually arranged as follows: where the larger spacings bring the points of support parallel with the ridge, the girders are carried above the gutter line and the principals of the roof are framed into the lower plates of these girders; but if the points of support are to be across the line of the ridge, then the girders are formed of a Warren type, with the members following the line of the Weaver roof, in which case both the glazed and slated sides

of the roof will be carried through the supporting girders continuously from outside to outside of the factory. The height at the eaves of these one-storey buildings is probably from 16 feet to 18 feet.

All gutters for this class of roof must be adequate, say 18 inches to 24 inches wide, strong cast iron, with rebated joints, and fitted with proper boxed cistern outlets. There is no necessity to have these gutters with tapering cast, as they will clear themselves of water to outlets 50 feet to 60 feet apart, and in case of replacement there is then no likelihood of delay and inconvenience due to the necessity of casting a special taper. If the length between outlets is greater than 60 feet the depth and width of the gutter must necessarily be increased. The gutter outlets are connected to the heads of the columns carrying the roof, each column can be conveniently used as the outlet itself, the column head being arranged so that none of the bolts connecting the roof girders will pass through the head itself, and at the base of the column it will be convenient to cast on sideway outlets, with flanged joints, to connect up to outer bends into the ordinary drain, the core of the column filled in with concrete to the height of this outlet, and benched off to throw the water outwards. If, as is more usual, stancheons are used as the roof support, downspouts will be carried in the hollow of the stancheons.

For factories of 120 feet to 150 feet span, and requiring a considerable amount of light, the following form of roof is being largely adopted on the Continent. The principals spanning the full width are formed as light Warren girders, of a depth between 14 feet to 20 feet. On both wall sides the whole depth of the girder is glazed, and from the head of the glazing, from one side to the other, concrete flats are formed, but not over the centre one-third of the shop. These flats are laid with a slight fall outwards. The space left in the centre of the roof is then framed as an ordinary pitch roof, glazed on both sides. Such a roof gives an enormous amount of light into the area covered, and if it is used in a shop where ventilation is very necessary, the centre portion of the roof is lifted from the level of the flat on to framed louvres.

All of us must at times have been confronted with peculiar conditions necessitating special types of roof; but they would be of little interest to mention here, as they are of no general suitability. Plant engineers, for their special requirements, appear to make more and more use of the roof and roof space, and lately I have adapted a roof to carry the cooling tanks necessary for the jacketed cylinders of a large gas engine, the particular case being met by replacing the principals, where the tanks occurred, with properly framed girders carrying between them a concrete flat upon which the cooling tanks were placed.

Having considered the roof principals themselves, the question arises as to the most suitable forms of roof covering. Special houses, such as boiler-houses, acid chambers, or chemical buildings, would require special treatment, but for factory roofs generally it is desirable that they should be boarded, the covering after being either slate or patent roofing, according to position, suitability, and cost. The most successful roof framing and covering for such as the English climate is one framed with purlins some 3 feet 9 inches to 4 feet 6 inches centres, covered with dressed boards 1 inch to $1\frac{1}{4}$ inch thick, tongued and grooved, and laid directly from purlin to purlin, covered with felt, and with vertical and horizontal battens, and afterwards slated. Patent roof coverings have still to be proved, but they undoubtedly appear satisfactory, and are easily laid and quite simple to handle in gutters and around louvres. Concrete filled roofs, either on the flat or on the rake, are usually asphalt-covered, and are quite readily handled and rendered weather-proof.

Before leaving altogether the question of roofs, I must refer to certain difficulties which are experienced with light steel principals, where they are required as supports for special stationary loads, travelling loads, shafting gears and conveyers. For stationary loads, there is no difficulty in so bracing up the members of the principals as to take up the load required without fear of strain or collapse. This also applies to provision for travelling loads. But with regard to their use for shafting fittings, there can be no doubt that they have not the advantage that the old wooden roof had in carrying lines of shafting without any risk or vibration. Pulley brackets and shafting seatings were easily fixed, and

steadily held when the machinery was in motion, the ordinary size of wooden roof members necessary for the roof construction having in themselves sufficient rigidity to form a satisfactory bearing.

With the steel roof, the solid tie-beam of the wooden roof is replaced by a flat steel member, offering little or no possibility of attachment, and in itself being unable to carry any load. It therefore becomes desirable in most works to carry the lines of shafting on the main lateral girders of the roof, but any shafting required in the centre of the bay must be provided for, either by constructing the tie member of the principal as a joist or channel section equal to the load, or carrying it on a specially constructed framework of girders framed and bolted to columns erected for the purpose, and in that case standing clear altogether of the principals.

I have referred frequently to roof glazing, and in all cases I have had in mind the many excellent forms of patent roof glazing which are turned out by English manufacturers. Most of the patentees have carefully considered the subject, and can now with equal facility glaze their bars into timber, steel or concrete connections, and provide an excellent form of weatherproof glazing even with a pitch as low as one in thirty. Rapidity of execution, easy renewals of broken sheets, and renewals of special parts are not the only advantages. By special arrangement of the bars, one can be certain that condensation will not drop from the roof on to the floor beneath; this is a matter of very considerable importance where the manufacture of certain articles is carried on in shops where a certain amount of free live steam or vapour is given off. Where possible, the sheets of glass should not be of greater length than 9 feet, though if required they will be provided up to 11 feet. The glazing of a very considerable amount of Continental factory work is carried out with plain T section bars, the glass being puttied into the rebate. Such a system would certainly not be watertight for any length of time with such a climate as we experience in England.

No one nowadays undertakes the erection of a factory where valuable machines are installed, and the product of the factory is of considerable value, without installing a system of fire protection sprinklers. A large tank, standing at a point at least 16 feet above the ridge of the highest building that is to be fitted with sprinklers, is a familiar landmark in any manufacturing town. As a rule, these tanks are filled from the town water mains, but in districts where the head of water is not sufficient to rise to the tank, a set of pumps is installed, which become operative as soon as any of the sprinklers are open by the action of a fire. Time and again one sees the result of the sprinklers after an outbreak—as a rule showing that the fire has been got under almost within a few minutes of the outbreak, and little but local damage has occurred.

I should not dare to offer here in London, with your stringent regulations as to fire risks, many criticisms or suggestions on this head. Certainly in that monumental Building Act the greatest care has been expended in tabulating conditions that should localise and restrict as far as possible any outbreak of fire, and although these conditions impose a considerable amount of cost in the erection of the factory, we ought not to quarrel with the intentions of those who have drawn up this Act, though we may question the necessity of some of the regulations. Shortly, if the conditions of the London Building Act were generally followed, at least as much as possible would have been done in the construction of factories to lessen all fire risks. Position of works, and locality, do not, however, always require such exacting regulations, nor will costs always allow of more than the merest necessities. Hydrants, hose, reels, boxes, sand-boxes, etc., must always be supplied in greater or less quantities, according to the trade carried on and the risks involved.

Probably under no condition can an outbreak of fire be more readily controlled or localised than in a one-storey building. As a rule, there is ample opportunity for employees to escape into adjoining shops, or into the open, and for the clearing of all combustible material from around the fire area. On the roofs covering these areas there must be no unnecessary obstacle that will impede the assembling of hoses and reels. Gable ends should be hipped against the outer parapet walls, and if the lengths of roof are considerable, a break at one or other of the dividing walls would probably be an advantage in dealing with a fire. Department divisional walls should be carried up, as required

by the London Act, 3 feet 6 inches or 4 feet above the adjoining ridge or line of gutter; and finally, no important works building should have overhanging rafters at the eaves. I mention this condition because within the last few years I witnessed the fire of a very large seed warehouse, and unless I had been present I could hardly have believed how quickly the exposed ends of the spars and boarding would catch fire. As soon as the top storey windows were in flames, once the rafters were alight they carried the fire along the length of the building, and in a very short space of time the roof collapsed. But on this same occasion a still more remarkable demonstration took place bearing on this point. The eaves of a building some 40 feet away, across a works street, suddenly burst into flames from the heat of the burning warehouse, and quickly set fire to the roof of a building which otherwise would have escaped. My opinion at that time was that if both these buildings had had parapet walls the fire would certainly not have spread from one building to the other, and probably not throughout the whole of one warehouse. In the case of high buildings, these parapets are a protection which enables the roofs to be more readily repaired, and with that protection the roof is probably more often overhauled by those under whose care and attention this work falls.

The principles which govern the factory staircase are those which apply to all public buildings, namely, suitability and directness of access. Their position in the works will be governed by a number of considerations, both as regards traffic and purpose, but no circumstances must be allowed to cramp or confine them into out-of-the-way corners. They should be of a width convenient for the numbers using them—and if this means a greater width along the step than from 7 to 8 feet the flight must be divided by suitable plain round handrails with strong iron standards, also with plain handrails fixed on the wall side. No flight should be of a greater number than twelve steps, and these not greater than 6 inches rise, or less than 11 inches on tread. All landings must be full half, and the outlet or doorways at the top or bottom must open into as large a collecting area as possible. In a word, when deciding the position and size of these staircases, one must always have in mind their use in case of fire, when quite possibly a mad rush would be made to leave the building. The doors must open out from the staircase; and the flights should be well lighted and ventilated from the sides away from the factory. The materials used for the steps should be either stone or concrete; in some cases, slabs of timber, of not less than 3 inches thick, may be used. Iron fire escape staircases are quite familiar to us all. With these, it is desirable that the risers of each step, so often omitted altogether, should be solid or perforated, to prevent accident to those using the staircases.

Doors and general factory fittings we cannot possibly deal with to-night. With regard to factory windows in the external walls, these vary very considerably according to the class of trade carried on, but probably the most usual form is the large steel or wrought iron standsheet window, which is equally suitable for brick, steel-framed, or concrete structures. With the decrease in the size of the brickwork pier, these windows have been increased very considerably in width, and I have used them to the extraordinary size of 21 feet high by 14 feet wide; these particular windows requiring a framework of steel behind them, to support them against wind pressure.

Leaving these details of construction, I shall now turn to one or two special buildings of the factory. I referred previously to the shops which are found in large bridge building undertakings. These buildings consist of a central bay of 100 feet span, and some 50 feet to 60 feet in height. The supporting stancheons carrying this roof are also arranged to carry heavy travelling cranes, which run from one end of the building to another. In the case of particularly heavy cranes, the gantry girders sit directly on the head of the stancheon, which at that point reduces in size and is carried up to receive the roof.

Adjoining this main erecting shop, usually on each side, opening out under the gantry girders, are buildings of one or even two storeys in height, of smaller spans, and these act as fitting shops, in which are carried out the lesser parts of the manufactured article which is assembled in the central bay. As a rule, these side spaces are occupied by drilling, screwing and finishing machines, and are constructed wholly in steel, the upper storey being lighted from the roof, and the lower from windows at the side. In

some cases even lighter travelling cranes are fixed in these outer shops, and this handling of goods by crane and lesser weights by runways is a considerable factor in the equipment of works of this character; and so important in some cases has it become, that the linking up of one line of travelling cranes to another is frequently required and is formed by an arrangement of fixed connecting girder, which thus allows of an assembled portion of any machinery to be carried to any portion of the side or central bay. These structures are, as a rule, not filled in with brickwork, but are wholly glazed on steel frames from pier stancheon to pier stancheon. Such a building is undoubtedly bordering on engineering lines.

The many-storeyed building of a factory may be of such variety that I can do no more than mention one or two general statements on these. The questions of importance, as regards construction, are those of support and floor girders. As regards supports, these in a composite building will be either cast iron or steel, and there is much to be said for both. Cast iron, in case of fire, has properties for resisting the action of fire that steel does not possess, and, on the other hand, steel stancheons will give a rigidity to a building and occupy less space in proportion to the load carried.

Cast-iron columns are now designed with box heads providing seatings and connections for the floor girders and joists in the cap of the column carrying the floor, the column of the upper floor sitting on the top of the box head, on a machine-dressed face. Stancheons are built up and are practically continuous through the floors, with the girder seating connections riveted to the side. As regards calculation for these supports, it is very usual to take an average of floors loaded, and to design the beams on that basis, it being assumed that not all the floors could be loaded at one time—a condition which must readily be admitted; but although the floors are never wholly occupied, very often the loaded portions are all over the same lines of supports, with the result that in effect the warehouse is fully loaded. The roofing of these large many-storeyed buildings presents no difficulties, either as a series of span roofs or as concrete and asphalt flats.

As regards the Warehouse for Finished Goods, the floor level of this building must be arranged so as to be suitable for loading the goods on to motors or railway wagons, or other form of conveyance. As a general guide, 4 feet above the railway metals is usual; and on the loading side the roof of the warehouse or a lean-to roof is carried over the first or second line of railway metals, to protect the goods when being loaded. In certain cases of extremely heavy loads, the goods are loaded by cranes running from the warehouse over the sidings, or the trucks entering into a certain portion of the works itself are loaded by the crane used inside the shop.

I will now endeavour to outline the Power Plant Buildings of a factory. Before I do so I wish to say that the power required in the ordinary factory—either steam or gas, or electric power—has in no case in my experience approached a greater total then 10,000 H.P., and that an aggregate of many engines generating the power up and down the works. Beyond this my remarks do not apply, and certainly not to those large central power stations where the whole undertaking is the generation of electrical energy.

It is indeed a large works that requires much over 5,000 to 6,000 H.P., and the lay-out of such a plant falls upon the shoulders of the consultant engineer, whose scheme and engine-bed drawings are handed to the architect to arrange for the construction of the engine house, boiler house, economiser house and chimneys, in the general character of the factory buildings. Whoever dares to risk, in the slightest degree, the proper foundation of buildings of this class, is courting the most serious disaster and assuming a very grave responsibility. There are countless works in this country which make the engine house their "showroom," and there is no doubt that in an orderly and well-arranged power house there is something extremely fascinating, especially where there are several engines all of one power.

The walls should have glazed brickwork or tiled dado to a height of 5 feet or 7 feet. Above this level the brickwork should be some buff or other coloured sound hard brick, carried up to the line of the eaves. All angles should be rounded both at the junction of the walls and floor and on the piers. All floors should be finished with hard tiles. The roof may be either steel or timber; if the latter, all

members should be dressed and varnished. The roof should be boarded, felted, battened and slated, with a large proportion glazed; and a line of pivot hung ventilators should be provided, all double rebated and opened by screwed gear. Such details in my opinion will add to the life of the engines, and therefore will quickly pay for themselves many times over.

For factory work, probably between 55 feet to 85 feet is the usual width of the engine house. It is desirable that the span should be in one, to cover each set of engines, and the height of the roof such as to allow for gantry wall girders carrying a running crane. Cranes are useful not only in assembling the engine when first erected, but also in case of repairs to the different parts. I am quite aware that they are costly, and it sometimes appears that there is a considerable amount of capital lying idle in them for months together, but when one considers the cost of erecting special gantries to execute repairs of the smallest character, and further the greater certainty in handling the engine parts, and probably the fact that the small repairs would not be tackled without facility of handling, then the money laid out in these cranes appears to be well spent.

In some of the old Lancashire mills engines are still in daily use of the old beam character, and some with oscillating cylinders. Last year I took down an old beam engine erected in 1760; it had been constantly working during that lengthy period. This engine had two vertical cylinders and one slung oscillating low-pressure cylinder. The smoothness with which it worked in its last days, after its long and useful life, would have done it credit at the date it was erected, and made it seem almost a pity to destroy this workmanship of a bygone age. But it had to give way to a new engine of a very considerably increased horse-power.

Some very considerable changes have taken place in the requirements of the Engine House during the past eight or ten years. Most of us will have laid engine beds of solid stone and of solid concrete, possibly with small adjoining cellars or houses formed for the condenser—but at any rate the bed upon which the engine was built was itself solid throughout. Gradually more and more of the space around the engine bed has been required by the engineer, for some pipes or fittings in connection with the machinery, until at the present time the whole space around the bed is formed as an open void covered at the level of the engine bed.

Following upon this, the engine house floor is usually on the first floor level, and the space around the engine beds, at the ground floor level, is left as a well lighted chamber, for the engineer to fix the condensers and other parts. The concrete in the beds themselves is pierced through and through for connections, and is massed where the loads and the shocks are greatest, and in parts reinforced with steel bars to avoid the risk of fracture. The channels thus gained are of immense advantage in building up the engine and making the necessary attachments.

How far the architect is supposed to be responsible for this work it is difficult to say, but that we are looked to to produce solid work capable of great strains and shocks is undoubted; this can only be accomplished by constant inspection of the materials and workmanship, the use of cement well up to standard tests, and having some tradition as to manufacture and durability, the aggregate clean and not too large and of a gritty nature that will bind well with the cement. With these points well in mind, and tests constantly taken, provided the engineer has himself sufficiently calculated the strain on the concrete, the foundation will be a success.

I do not know that anything special calls for attention as regards the Boiler House, more than that all brickwork of walls, beds, and flues must be grouted fully and thoroughly. For roofs, I prefer steel principals, probably with steel angled purlins, covered with slates copper-wired to the latter; open steel louvred ventilators the whole length of the shed, and the roof glazed in a proper proportion to give light over the boilers and to the stokers.

Of the many classes of boilers it is not in my province or knowledge to deal, but it would appear from experience that, for factories requiring a steady head of steam, the Lancashire type seems the oftener to be installed. If so, as a rule it falls to the lot of the architect to carry out the boiler seatings

—usually special seating blocks, which, whilst giving ample support to the boiler, cover as little as possible of the boiler plates, thus giving the gases full play on the heating surfaces. Should the boiler be fitted with super-heaters, the boiler house will require to be of greater span, and the back flues will require certain rearrangements. Economisers nowadays almost invariably form part of the boiler plant, and are placed in buildings of the same character as the boiler house, provision being made for ready access to the cleaning spaces, and ample ventilation above the sets of tubes.

With the question of the system of draught to the boiler flues, we enter upon a subject that is dear to the hearts of the engineers, and it will be for the works consultant to decide which of the usual forms are to be employed—tall chimney, forced or induced draught. I have built foundations for short, low chimneys for an induced draught plant, and certainly it is wonderful the point to which combustion can be brought, so as to give off at the top of the low chimney almost colourless vapours. Engineers in this country appear to prefer the large chimney so familiar in our manufacturing towns. These chimneys require no special skill in designing, but require good foundations and good material, coupled with great care in building. For any great height, no chimney should be built in heights greater than 14 feet at a time, then the work allowed to set ten days before another height is added. This rate of progress should be carried up to the coping.

The firebrick lining should be carried well up the inside of the chimney, and usually formed with a cavity of 2 inches to 2½ inches between the inner lining and the outer wall of the chimney. This cavity it is the usual custom to close at its extreme height in the chimney, but never bonded into the outer wall. At times I have found this inner lining bonded into the chimney wall, with the result that the expansion due to the heat from the flue gases has broken all the bonding bricks, and caused a certain amount of the inner lining to collapse.

The thickness of the outer walls will naturally depend upon the height and diameter of the chimney itself, but in heights of 20 feet to 25 feet the walls will diminish in thickness by half bricks only. The thickness of the top length should not be less than 14 inches. In the outer walls in the height of the chimney, and at intervals of from 10 feet to 15 feet, it is usual to insert galvanised steel bands, formed in four sections, bolted together—the whole band being carefully grouted in cement. These bands are taken up the whole height of the stack, and usually the top one is arranged as part of the chimney cap itself, and I would suggest that, for a factory, the more simple the over-sailing for the chimney cap, the more satisfactory it will be from the point of view of repair.

The smaller chimneys for the induced draught referred to, need not be more than the height of an ordinary Lancashire boiler, or 30 feet; in fact the old boilers with the plates and tubes drawn are often used for this purpose, being lined part way up with firebrick. In some cases, however, these small chimneys are carried up as corner towers of the boiler house or factory.

In most factories it is desirable to consider the ventilation and heating as one plant. Small shops no doubt can be adequately ventilated by means of cross windows, and some form of extractor; but in the large areas of one-storey buildings, it becomes necessary to provide some mechanical means of propulsion that will, by the delivery of an adequate supply of fresh air in summer and fresh heated air in winter, remove the whole of the foul air from the factory. Such an apparatus in a large area may have to be split up into units, but each apparatus consists of a fresh air inlet tower, a heating battery, and fan, with steel ducts running through the roofs delivering fresh air to every point in the factory. By such a system of internal pressure, all openings, doorways, etc., become the outlets for the foul air, and the number of times each hour that this replacement of air is to take place must be decided upon by the class of work carried on in each department. The heating batteries are supplied with steam at a low pressure of 10 to 15 pounds per inch, and the fresh air duct is fitted with a valve that will enable the air in the shop to be recirculated in case of extremely cold weather, or after the week end when the factory has been lying idle.

I do not suggest that every means of opening windows and skylights is to be omitted, even fresh air

distributed by these fans is not like the direct current from without, but on the hottest of days, when there is not the slightest movement of air outside, the fans produce a movement in the shop that is undoubtedly refreshing.

As I said at the commencement, I can touch, and only touch, upon matters many of which might be greatly enlarged upon, and I cannot pretend to have opened out to you any new theories or laid down any definite axioms for future factory design; but I have tried to put before you matters connected therewith that I find occurring daily in work under my control. That the last twenty to thirty years have shown varying changes and marked and amazing progress is undoubted; and I believe that the next twenty to thirty years are likely to see still greater changes and far greater progress. The commercial life of England is likely to be offered opportunities which it certainly has not enjoyed in the years just gone by, and when these opportunities are forthcoming, they may be helped or hindered by the power, or lack of power, which will be with us to meet these situations as they arise, guiding where we cannot command. We shall be called upon to work to many altered conditions, and must turn them to the proper advantage of the commercial undertakings; it is true there may be more interesting and absorbing sides offered to our profession, and that factory undertakings deal more in the science than in the art of building, but if I might venture to offer a word of advice to any students, I should say that they need not hesitate to be engaged upon such work, as it is one of most varying interest.

One personal note I should like to add. My training to this profession has been in direct association with two, both members of this Institute, Sir William Lever and my father, the late Mr. William Owen. To Sir William Lever I owe the opportunities of working out many problems in factory work at home and abroad, and also in connection with a large factory village. I have had, therefore, the advantage of working for one who, I do not hesitate to say, before any others desired to surround his workpeople, both inside and outside the factory, with buildings, houses, and under social conditions which had never been seen before he started Port Sunlight. The factories are bright and clean as any home, the cottages bright within and without, and rivalling in conditions the open air life of any village in the heart of the country. Big problems of finance and commerce were never so overwhelming that Sir William Lever did not give time and thought, and lay out vast capital sums solely and wholly for the benefit of his workpeople. Under such conditions, you will well understand that mere solid problems of weight and stress have a very different interest.

I should have liked, had time permitted, to have referred to several of the Institute buildings which Sir William has erected in his village, and where from time to time collections of priceless furniture, pictures, and china are on view, thus affording the workpeople of his great industry the opportunity of being directly in touch, at their own hearth, with the highest forms of Art that this world has produced. Such a condition will probably never be reached again, but it was amongst these surroundings and conditions that much of my work has been undertaken, and the administrative conditions of a factory which I dealt with early this evening I saw developed under Sir William Lever's own guidance and instructions.

Of my father I can say but little. For a provincial practice, such as is rarely understood in London, he could, I think, have claimed some success. He was a student to the end of his days, and when I first joined him I was struck with the enormous amount of interest and happiness which he obtained from that side of his practice so closely allied with factory work, but I believe he was one to whom the simplest form of building, however plain, was in itself a great joy. Other work found him a greater joy, but I can never forget his keen desire to achieve, and the joy that would come over him in the completion of the simplest form of building if, in his mind, the object of its purpose had been obtained.

DISCUSSION ON THE FOREGOING PAPER.

THE PRESIDENT, MR. ERNEST NEWTON, A.R.A., in the Chair.

SIR WILLIAM LEVER, Bart. [*Hon. A.*], in proposing a vote of thanks for the Paper, said that Mr. Owen mentioned that he had not advanced any new theories. That, he thought, was the strength of Mr. Owen's position. Factory buildings could only be developed by the experience gained by each new departure in the machinery to be installed. His own firm commenced their experience in factory-building in 1886, with Mr. Owen's father; and that experience had been so satisfactory that, although they had had many architects in connection with the village and its institutions, they had never had any architects but Messrs. Owen for their factory buildings. The architect could meet the requirements of the business and of the owners only by an almost lifelong study of the problems involved. As far as their buildings were concerned, it was along those lines that they had been successful in developing their undertaking with the help of Messrs. Owen. But he would like to see more cheapening of factory buildings. Whilst everything in the way of machinery, engines, electricity, and other productive plant was enormously cheaper, the price per cubic foot of their buildings was always advancing. Factories to-day were built much more solidly than was required. A factory built too solidly was not an economical building. A mere change in the process of manufacture, or in the type of machinery, involved probably the scrapping of the old building and the erection of an entirely new one. Engines and factory buildings wanted renewing almost as often as one's overcoat. That was a matter which should receive attention. He could not speak too highly of rest-rooms, surgeries, and general facilities for the health of the employees. At Port Sunlight they had over 2,000 girls in the factories, and every block of buildings had its rest-rooms. They found that the opportunity of using these rooms was never abused. Before the rest-rooms were provided girls were often seen with their heads on the table unable to get on with their work. Now, if a girl needed to go into the rest-room she was back at her work almost directly. If baths and rest-rooms and other modern luxuries—if they could be called such—were provided employers would find themselves amply repaid in the health and vitality of their workpeople. Not only that, but it raised the whole stamp of the people employed. By the adoption of these arrangements he had seen the type of factory girl improved to the type of shop girl, and as the hours were better in a factory, and the factory could be well ventilated and well lighted, he thought that the type of the factory girl could be made superior to that of the shop girl. With regard to planning extensions, there was only one type of factory building which commended itself to him, that which might be called the "concertina plan." If the site were limited, only the outside boundary walls need be permanent; the whole of the inside divisions, in his opinion, might be a half-brick in thickness; they should be of such a character that they could easily be torn down to enable the departments to be enlarged. People often thought they knew when finality had been reached in a department of the business, and they wanted it built as a separate unit, or as a more or less rigid section of the factory. But there was nothing so changeable as the various departments of a factory: one department shrank and could be reduced, while another department grew and expanded. With fixed walls only on the boundaries all these changes could be made without interrupting the work, and with very little expense. The question of price per cubic foot was one that ought to be reduced to a more scientific level. He had found it to vary in different parts of the country, and in the case of different architects, from 3*d.* to 8*d.* per cubic foot. Under present conditions, he supposed 3*d.* might be considered the irreducible minimum. But the changes from 3*d.* to 8*d.* could largely be avoided if the architect would thoroughly study the building of factories and the most economical way of meeting the requirements. There was no greater handicap on a business than an expensive factory building; it had no productive value, and was a serious burden on depreciation, and generally on the expense of output. With regard to the small details of the work, he commended Mr. Owen's Paper strongly, for Mr. Owen had had a long experience, and, as far as he (the speaker's) own experience went, he was in hearty accord with his views. With regard to the risers and treads of staircases, he found some architects past praying for; they made a factory staircase very little better than a step-ladder, and the wear and tear on those who had to use it was very great. On the subject as a whole, he did not pretend to be able to add anything to their knowledge. Each business required its own type of building, and if architects would specialise for different industries in the same way that they had specialised in the various styles of architecture it would be a very good thing. Factory owners were sometimes in a great hurry to get their buildings up; but it was of greater importance to consider all the points in relation to a factory than in a fine Government building in Whitehall. One word as to building restrictions: it should be remembered that London was still the greatest manufacturing centre in the world. They were apt to think that Lancashire and Yorkshire and the Midlands were the greatest; but for the same area

there was no manufacturing centre as great as London. Yet the regulations in force in London all tended to make it impossible to carry out a manufacturing business there. One point in particular he would mention. There were certain sizes of rooms laid down, and if that size was exceeded a division wall must be put up. He had encountered that provision in building a warehouse in London, under Mr. Owen's wise guidance and help, and they were crippled and handicapped with what appeared to them to be a needless multiplication of interior walls, which hampered the transportation of goods from one part of the warehouse to another. These inside divisions made economic control impossible. Such a business as printing, for instance, which should be indigenous to London, owing to the ease of distributing printed matter rapidly, was made almost impossible to carry on owing to these by-laws. Again, they were believers in safety from fire and in taking every possible precaution; but the by-laws had been carried to such a point that factories suitable for economic production could not be built in the City of London. He felt certain Mr. Owen's Paper would be of the utmost possible help to them all, and he had the greatest pleasure in moving a hearty vote of thanks to him.

MR. MATT. GARBUTT [*F.*] said he had pleasure in seconding the vote of thanks. He noticed with some satisfaction that Mr. Owen took a conservative view of many of the problems which confront the factory architect; and it was pleasant to note that he had been more fortunate than most architects in being allowed to take a very wisely-generous view of the accommodation proper to be provided for factory operatives. His list of the constituent parts of the administrative buildings contained items which one would like to see everywhere, but very often the client simply would not permit their inclusion in a scheme. He was a little sorry to hear Sir William Lever approve so strongly of specialisation by architects. Might it not be that the man who does not specialise quite so much, and who had a wider outlook than the specialist usually has, would be likely to produce better work all round, and perhaps particularly in factory design? We, as architects, suffered a great deal from specialisation, and particularly from early specialisation. Mr. Cram, when he read a paper before the Royal Institute about American University buildings, commented on the fact that what they call in the States "vocational training" is being, to some extent, abandoned in favour of a return to the old "classical" education, because the latter produces a better practical man in the long run, by giving his brain, in the earlier stages of education, that general training which is almost impossible of acquisition later. Having regard to the length of his Paper, Mr. Owen had said he would not deal with the site, but the speaker took the opportunity of saying that he considered we ought to be able to make use of sites for factories on canal banks to an extent far beyond what is actually done. The canals had been allowed to fall into the hands of the railway companies, who might be said to "burke" rather than to work them, in the hope that their railways would thereby be helped to monopolise the traffic. Possibly now that motor transport on the roads is becoming so prominent a competitor, these companies might themselves endeavour to develop the canals as auxiliary to the railways, greatly to the benefit of the country. With regard to Mr. Owen's remarks about the materials used, the speaker thought it was not so much a matter of what material was used, as of how it was used. We were beginning to get used to the idea of going back to big baulks of timber for fire-resisting purposes, a method favourably viewed in many parts of the Continent, and one of which we may see more here should Bye-Laws permit. Cast-iron, too, seemed to be coming into its own again. In connection with the use of this material, he remembered one building where a very heavy weight was carried upon a group of Doric columns, of cast iron, about 18 inches diameter, and spaced at about 6 or 7 feet from centre to centre. These, at all events, gave one the idea of very adequate support, and they had done duty for a century, but the scheme might not meet with Sir William Lever's approval, in view of his demands for open floor space. Mr. Owen would have our support in what he said about ferro-concrete; he summed up the factory man's view about it very well. He might have added that the cost, which is so often the determining factor, is against this material in every factory which is subject to much alteration. Sir William Lever could not carry out his principles of factory building in London to any great extent. London was certainly a big manufacturing town, and we had, especially towards the East End, some big and heavy works; but unfortunately such large works seemed to be leaving us. Among other misfortunes, we had seen in recent years the closing of the Thames Iron Works. And any factory at all near to the centre of London must be a building of many floors in height, and thus be restricted to the manufacture of comparatively small and light goods. London itself, by reason of ground values, did not seem a possible place for heavy works; the building and other regulations were also a sore point with us, and these things together are driving factories from the centre to such places as Watford, Edmonton, Tottenham, and even farther afield. In considering a Paper like this, one was impressed with the largeness of the demand made upon the modern architect. The man who was to deal with factories must either have a considerable knowledge of the various businesses carried on in them, or he must work in very close touch indeed with the engineers or other technical men who are engaged in them. Probably a little of both methods would give the best final result. He would like to ask one question. Mr. Owen had referred to "patent roof coverings," particularly as to their junction with gutters and louvres; would he give an instance of the

class of covering he had in mind? As to high factory chimneys, he (Mr. Garbutt) thought that in this country the extremely high type was almost abandoned, except for chemical works and other places where objectionable fumes are to be got rid of. The general maximum height seemed to be about 200 feet.

MR. WILLIAM DUNN [*F.*], rising at the instance of the President, and referring to Mr. Owen's remark as to the change which had taken place in factory buildings during the last thirty years, said that, personally, he should note a change much earlier. When the factory system came in, the conditions under which the people laboured were so very terrible that it only required a Royal Commission or a Parliamentary Committee on Factories to discover and make known the facts to awaken all that new sympathy which was one of the characteristics of the last century. As soon as the real conditions were discovered, we set to work to remedy them; and he thought that more than all the penal legislation ever enacted was done by the sympathy of our people in bringing about a change for the better; aided, as it was, by the manufacturer, who saw that not only *ought* he to treat his fellow creatures better, but that it would actually be *profitable* to do so. However severe legislation might be in regard to London, he did not think it had ever yet called for rest-rooms or surgeries or bath-rooms or dining-rooms, or other forms of Port Sunlight accommodation. That had been left for men like Sir William Lever to introduce, and many would doubtless follow his example. He agreed with Sir William as to the serious handicap laid by the building bye-laws in London on the trade of the country. He had seen this for a very long time, and it was getting worse, for the bye-laws were imposing more and more restrictions, so that the attitude of the public official seemed to be that of the lady in "Punch" who said to the nurse "See what Tommy is doing, and tell him he mustn't." He was afraid there was no hope for the powers that be; they seemed to have set their minds on Teutonic models. But perhaps one result of the War would be to divert us from that, and we should be allowed to live and build with some of that liberty which has done so much to make the country what it is. We have not made our name great by being governed and directed in every way as to what we are to do, but by having things left to the initiative and freedom of the individual. Mr. Owen had spoken in his Paper about factory roofs. He (Mr. Dunn) remembered that when he was a very young man the roofs were all made of iron, with circular single tie-rods. But since the disaster to the Charing Cross Station roof it had been much more usual to make these of flats and double. And, though he had not much experience of factory buildings, tie-rods seemed now to be made of two angles, back to back, which afforded a very convenient method of attaching at least light shafting to the roof principals. With regard to the very large spans Mr. Owen had spoken of, when he (Mr. Dunn) had to do with factory buildings, the works manager, who laid out the general plans for the factory, usually proposed a smaller span, of about 20 feet. But in the end it was agreed that about 28 to 30 feet was an ordinary average span for a saw-tooth roof. A factory building was, to the architect, a disappointment; he got a plan from the manager which seemed to present quite a simple arrangement, and he thought it was going to be quite a simple problem, if not an interesting one. But in a short time he was favoured with a large number of drawings of machines, boilers, and other plant to be used in the process of manufacture; and it was his function to duly assemble them all. And as each machine-maker prepared his part with an utter indifference to every other man's, the architect found that his problem eventually was not lacking in interest. He was glad to see that they as architects had got a share in making the lives of their fellow-creatures a little better; and though they could not make the site for a factory to blossom like the rose, they could keep it from being as ugly as it might otherwise have been; they could do something to make it bright and interesting. He was glad they had amongst their British merchant princes some who did what they could in this way, and who gave them as architects an opportunity of having a little share in it.

MR. MAX CLARKE [*F.*] said he had had some experience in factory work, very limited, evidently, compared with that of which they had just heard. His remarks would form, he was afraid, a series of questions to Mr. Owen, because he always tried to extract from the reader of a Paper as much information as he could. The first question he would ask was where Mr. Owen thought the architect's duty ceased and the engineer's began. The question was exercising him somewhat at the present time: how much responsibility the architect should undertake, how much he should try to assume, and at what point he should call in some additional assistance of a more or less special technical character. And then the question arose: Who should pay for that special information which the architect perhaps did not possess himself, although he might be more or less qualified to design an ordinary factory? His experience in factories had been confined to buildings costing anything from £10,000 to £30,000; and, unfortunately, he had not been permitted to build any of those "rest-rooms," or such-like places. Nor had he been permitted by the County Council to build anything like the building which Sir William Lever would desire. Not only in the "City of London," but in the whole Administrative County of London, the regulations with regard to factories were so severe that the fewer factories that were built in this administrative area the better it would be for the owners thereof. Was he to understand that Sir William Lever and Mr. Owen were not in favour of reinforced-concrete buildings for factories? Personally, he felt that a factory was one of those places that was, as Sir William said, subject to alteration at any moment. After the building was completed clients would decide to put down this, that, or

the other plant; they wanted a wall cleared away, or a girder or stanchion altered; and if the building was of reinforced-concrete the architect was in for a lot of trouble. Referring again to the County Council regulations, he would like to know whether these were looked upon in the provinces as being satisfactory, or whether they were regarded as too stringent. His feeling was that the requirement limiting each division to 250,000 cubic feet was very arbitrary indeed; it had come up against him in his work to such an extent that every time he dealt with a factory of any size, the first question his client put to him was, "Can't you make this division so-and-so in size?" His reply was, "Oh yes, I can apply to the County Council, who can give me special permission to make the building more than 250,000 cubic feet; but if I do, you will not be allowed in the future to make any alteration to that building without the sanction of the County Council." He considered that most arbitrary. He knew there were many people in the room who would not agree with him, but that did not alter his opinion. With regard to staircases, he thought Mr. Owen was liberal. A staircase which had steps of 11-inch tread and 6-inch rise was nice for a mansion, but would take up a good deal of room in a factory. The London County Council, notwithstanding the stringency of their regulations, allowed a 7½-inch rise and 10-inch tread. He had built many staircases, perhaps a hundred, on this basis, and they did not appear to him to be too steep, neither had he found that operatives complained of fatigue in going up and down. He thought some happy medium between those two might meet the case. He should object most strongly to any staircase that was made 7 feet wide for factory operatives; he thought a less dimension and more staircases would be very much more useful and far safer, in spite of the central partitions Mr. Owen advocated. He did not gather from the Paper whether the steps Mr. Owen spoke of were hard-wood or whether they were fir timber. If they were of hard-wood, it would be a very expensive operation to build solid wood steps. He had been concerned in a law-suit which took place recently with regard to the vibration set up by an engine and engine-bed. The engine, not a very large one, shook the whole neighbourhood; about fifteen houses down one side of the street and eleven down the other side were affected. If Mr. Owen's engine was mounted at the first-floor level, how did he counteract the swing of the bed? It was a most difficult thing to do; and he could not understand why they should not have the engine-bed on the ground-floor level and use a pipe conduit. He would also ask Mr. Owen if he had any experience of the modern furnaces, some of which would burn coke breeze and refuse, and not develop clinker on the bar. That point interested him very much, and at the present moment, when they on the Holborn Borough Council were paying 32*s.* 6*d.* a ton for their coal, it became a serious item. Some people regard this type of furnace as admirable, but he had heard that the unsatisfactory feature was the emission of dust from the chimney, which covered the whole area with a deposit of all sorts of rubbish and was very objectionable. Flat roofs for factories were very much more satisfactory than slated roofs; they required much less attention. Even the periodical painting of the iron gutters of slated roofs he had found a very serious expense; getting at them cost money, and the failure of the fixing at times was a danger, but flat roofs were accessible at any time, and very little repair was needed. He thought Mr. Owen might have given them his views with regard to lifts and hoists, because these formed a very important feature of factory buildings. With regard to factory floors, he had found that paving them with Granolithic laid *in situ* was not nearly so good as laying artificial stone slabs about two feet square; because when Granolithic once broke it was almost impossible to repair it satisfactorily, whereas with the slabs a broken one could be taken out and replaced in a very short time. He would also ask Mr. Owen whether he had found a flooring which would resist grease. It was a most important matter in factory construction, because there were factories in which grease largely predominated, and it seemed almost impossible to get a floor which would resist grease for any considerable period. He would also ask Mr. Owen regarding another point on which he had not touched. Did he advocate in these steel buildings enclosing the steel work with concrete? It seemed to him largely to depend on whether they had a "sprinkler" installation or not. The latter was rather expensive, but it rendered the building much more fire-resisting. He had seen a book which he thought would interest Mr. Owen and other members —namely, a Report on the fire which occurred at Edison's phonograph works at West Orange, N.Y., on 9th December 1914, and the behaviour of the reinforced concrete therein. It would be particularly interesting to those gentlemen who advocated the use of reinforced concrete, for it contained illustrations showing the position of the reinforcing bars in some of the members after part of the factory had been destroyed. The Report had been prepared jointly by the National Fire Protection Association in conjunction with the National Board of Fire Underwriters of America. Sir William Lever had spoken about the cost of factories. The cost depended on the nature of the factory. He thought that a one-storey factory could be built in the simplest way for 3*d.* or less per cubic foot. A factory could certainly be built at this price which would comply with Sir William Lever's requirements—for instance, a corrugated iron building, with stanchions, which could be moved about to any position as desired and with all sorts of half-brick division walls in it—and so long as it was outside the Administrative County of London it would answer all requirements. But when it was a question of a factory to be built in London many storeys in height, and restricted by all sorts of local and County Council regulations, the cost would mount

up to about 8*d*. He believed that was the maximum, and for that they could do very well indeed. He had great pleasure in supporting the vote of thanks to Mr. Owen. He had heard with the greatest pleasure Sir William Lever's remarks. He was at Port Sunlight once, and made many drawings for an advertisement which Sir William sent out to Chicago years ago, and it gave him the greatest possible interest to see the place. If they had only a few more people like Sir William Lever, the factory-designer would have an opportunity, the operatives would be better housed, they would do more work, and the proprietor would get a better return for his money—in fact, everybody would be more satisfied.

THE PRESIDENT (Mr. ERNEST NEWTON, A.R.A.): Before putting this vote of thanks to the meeting, I would like to express my personal thanks to Mr. Segar Owen for his very valuable Paper. It is a mistake, I think, to suppose that a severely practical building, designed only for material ends, is uninteresting to architects. So long as the problem is tackled in the spirit suggested by Mr. Owen, it seems to me that the nice adjustment of parts, and the careful consideration and arrangement of the different departments in absolutely the best possible manner, demand great skill and ability, and that if the varied and definite requirements are met and a building perfect for its purpose results, we get good and even expressive architecture. Mr. Owen is fortunate in having been associated with Sir William Lever, who has done so much to improve the conditions of labour. If Sir William had not devoted his life to manufacture, he would, I am sure, have made his name as an architect. We all know his keen interest in architecture, and all that he has done for it. I remember one day, at Port Sunlight, he told me he always wanted to be an architect. I at once offered to change places with him; but whether he thought I should be unfit to conduct his business, or whether he doubted his capacity to carry on mine, I do not know; at any rate, the offer was not closed with, and I take this opportunity of telling Sir William that it is still open! I have very much pleasure in putting this vote of thanks to Mr. Owen.

The vote was carried by acclamation.

MR. SEGAR OWEN, having acknowledged the vote of thanks, replied to some of the points raised in the discussion. He was afraid, he said, he could not do justice that evening to Mr. Max Clarke's long list of questions. With regard to calling in experts, he could only say that when he had arrived at a point where he felt an expert was necessary, he had never yet had a client who refused to pay the fee if he were given a sufficient reason for calling in an expert. With regard to reinforced-concrete buildings as factories, no general rule was possible; it was a material more particularly suitable for special factories, and generally it should be used for buildings in which no changes would be required. The provision in London concerning 250,000 cubic feet was quite ridiculous in some cases. In the warehouse Sir William referred to, one wall was within 10 feet of another, and the intervening space was continued up to the top of the building, and was useless. A special representation was made to the County Council, but was refused. With regard to engine beds swinging, it was not suggested that an engine bed received any support from its floor; it must be solid and take up the thrust within itself, even if it were for a gas engine. If when it was put at the level of the first floor it was going to rock on its bed, then the spread and weight of the bed was wrong in proportion to the horse-power. With regard to lifts, he had found it difficult enough to get what he wanted to say into a little over an hour, and if he had dealt with lifts he should have kept the meeting longer still. With regard to the best oil-resisting material for flooring, he had it from Sir William Lever that granite was perhaps the best. If for a small area, very hard vitreous tiles would resist grease. He agreed with Mr. Garbutt that the average height of factory chimneys was now about 200 feet. As regards costs, he thought it was labour and bye-laws which were their trouble at the present time.

MR. PERCIVAL M. FRASER [*A.*] writes:—

In making the following criticisms on Mr. Owen's Paper, I might mention that I suggested the reading of such a Paper last session when on the Practice Committee. I understood that the Council rejected this suggestion, and was agreeably surprised, therefore, to find a Paper was to be read by a gentleman of special experience in this class of work, the subject being one which has not been dealt with in any form in the Proceedings of the Institute. It is certainly one which takes a very important place in the architectural activities of the present day, and it is amazing that there is no book in the Institute Library dealing with any branch of the subject.

The first general criticism I would make on Mr. Owen's Paper is that the lack of illustrations considerably depreciates its practical value, and that its worth would have been greatly enhanced even if it were illustrated only with diagrams.

I would question the advisability of a minimum road width of 100 feet. Such an unjustifiable waste of space would not be tolerated in any populous district. From this, and other indications in the Paper, one cannot help feeling that Mr. Owen's field of action, though comprehensive and important, has been nevertheless limited to the Port Sunlight Scheme, where a number of amenities obtain which it would be misleading to lay down as general rules.

The author came rapidly down to the detail which he so much endeavoured to avoid, in describing so minutely the Administrative Department, which from the architect's point of view is comparatively unimportant. In this description, however, he omitted to mention a vital factor, and one which greatly influences the planning of this department—namely, the

necessity of segregating the sexes, upon which some hints would have been very welcome.

With regard to the formation of social clubs and institutes in factory buildings, most attempts to instal anything of this sort are abortive. This more particularly applies in populous districts, and in my experience I can cite many cases where the buildings erected for this purpose were eventually either taken down as encumbrances, or used for workshops or stores. Even messrooms, which have for their object the convenience and comfort of the workpeople, and indirectly may save them considerable expense, are by no means popular, and are better avoided, unless proved to be necessary.

A Member asked Mr. Owen the pertinent question as to whether he would recommend ferro-concrete for factory buildings or not, as this is not clear from the Paper. I cannot find any practical guidance on this subject, which is of the first importance to architects engaged in factory buildings. It is lightly touched upon in two paragraphs where the only recommendation for its use appears to be for stores. The other constructions for which the author mentions ferro-concrete as being suitable are those which scarcely come within the architect's ken.

In weighing the advantages of brick buildings, the author might have mentioned the value of heavy walls and piers in absorbing vibration where moving machinery is situated on floors above the ground.

With regard to pavings, the author recommends maple blocks, but this paving is a hundred per cent. more costly than the many jointless pavings known by the generic name of "stonewood," which possess all the advantages of maple flooring for factories. There are other forms of patent floorings on the market of the granolithic type, which are invaluable for heavy wear, and are economical. The particular pavings mentioned by the author are so well-known as to be scarcely worth setting forth.

Cast-iron valley gutters are recommended, but these are not so good nor are they cheaper than asphalte gutters.

The plan recommended by the author of using the internal columns as down-pipes, is one which cannot be too strongly condemned, and, except in abnormal circumstances, should never be adopted. The best form of roofing for almost all purposes, with the advantage that it is economical, consists of boarding sufficiently thick to span between the trusses (3-inch tongued boarding will span rigidly 12 feet) without the use of purlins. The advantages are: unbroken roof surfaces, good insulation, better lighting effects, no lodgment for dust, slow-burning construction, and appearance; moreover, it affords great advantages for the run of pipes and leads, and for the installation and efficient working of sprinklers.

An excellent material for roof covering, which the author ought to have mentioned, is asbestos tiles and sheets, which are rapidly coming into vogue. They can be obtained in corrugated sheets, and are invaluable for roofing boiler-houses and stores where cheap and non-combustible construction is essential.

It should be the universal rule to provide T or H section tie-beams to steel trusses, and not the exception, as one would gather from the author's remarks.

In connection with patent glazing, especially where adjoining flat roofs, the glass should be wired—*i.e.*, reinforced with wire mesh. The extra cost of this glass is slight, and is amply compensated for by the saving in breakage and its fire-resisting qualities.

The author appears to advocate sprinklers solely from the point of view of protecting buildings, but, of course, the incentive to instal sprinklers in the large majority of cases is the reduction in insurance rates (amounting to as much as sixty per cent.), which when capitalised constitutes a considerable economy, although in many cases they would cause in action as great damage as an outbreak of fire. Unquestionably the greater number of fires are got under by the use of chemical extincteurs and fire appliances, and if it were not for the corresponding saving in insurance rates, sprinklers, owing to their excessive cost, would be rarely employed.

The subjects of protection against and means of escape from fire are sufficient matter for a special Paper, as they are not commonly appreciated or understood.

A hint as to the selection of fire-bricks for boiler settings would have been acceptable. This material, which the average architect, I am afraid, accepts blindly from the builders' merchant, is one which in a contract of any importance should receive most exhaustive consideration and examination.

One feels that the author is hardly justified in shelving details of doors and windows and similar details in so cursory a manner, whilst, on the other hand, he devotes a considerable amount of space to similar minutiæ.

The familiar tirade against Building Acts and By-laws was indulged in, and I regret that the system of limiting discussion at the R.I.B.A. meetings afforded no opportunity to any member to defend these. It is simple and always acceptable to criticise destructively these regulations. They are, however, drawn up for the good of the community, though they must perforce act harshly in isolated individual cases. The real complaint is not against the By-laws, but against those who administer them. In London, where the Building Act is most stringent, building—to the well-informed architect—is not irksome or arbitrary, because administered by duly qualified architects, who have the necessary courage and sympathy to interpret the Building Act for the benefit of the community. District council surveyors, however, have often no technical knowledge, and rarely, if ever, are they qualified to deal with matters of building construction.

The proposed London County Council regulations for ferro-concrete buildings are open to criticism, not on account of their stringency, but because there has been a foolish attempt to govern not only the design

of the structure, but the manufacture of the materials and processes of construction, even going so far as to embody such clauses as the following :—

> Concrete shall be kept damp by means of wet sacking or be watered daily, Sundays and holidays included.

Such regulations are, of course, grotesque.

I would like to endorse the author's remarks on engine beds. There are no existing rules or means of calculating engine beds. Engine designers standardise the beds for their machines, based either on a ratio to the horse power, or in proportion to the dead-weight of the machine.

I do not agree with the author that there are *countless* works in this country which make the engine house their show-room. There is a very small percentage indeed which are at all presentable. On the Continent and in the States the greatest pride is taken in the appearance of the buildings in connection with the power plant, which in England are generally disgraceful.

The author laid only too little stress on the necessity of constantly testing materials. The architect who constructs factory buildings will find that he has to rely fully on his materials, and that stereotyped and orthodox safe loads for given materials cannot be blindly accepted if he wishes to give his clients full value for their outlay. There is no doubt that in factory construction the enterprising factory owner is willing to run a fair risk, and the architect who specialises must, in order to prepare an economical design, know his material in every sense of the word. This is a point which Sir William Lever so ably put to the meeting. He said in this connection that he could not understand the increasing cost of factory buildings, but one must make due allowance for the tremendous pressure at which the buildings are worked, involving far more costly construction owing to the concentration of heavy vibrating loads into small areas.

Sir William Lever's remarks as to the standardisation of the cost per foot cube, of factory buildings, were of interest, but it is obvious that valuation per foot cube is and must be grossly misleading, and can mean nothing either to the architect or to the factory owner. A much better method of valuing is per yard super of floor space, and an even better one is the cost per unit of plant, such as is commonly employed in spinning mills and smaller buildings, and which architects employ in church and school buildings in the form of valuation per head of occupants.

A member asked for information as to a suitable paving to resist the action of grease, and I understood the reply was "granite," but in what form this should be used was not clear. Granite is undesirable in the majority of cases for reasons too obvious to mention. The best floor is a hardwood wood-block laid in *suitable* asphalte direct on the concrete foundation *without screeding*. Practically no hardwood will suffer from the action of grease or fatty acids, and will stand for at least a generation.

In conclusion I would suggest that there is scope for further papers on a subject of which Mr. Segar Owen merely touched the fringe.

MR. SEGAR OWEN, to whom a proof of the above was submitted, writes :—

I have read with much interest Mr. Fraser's communication with criticisms and suggestions on my Paper, and on some of the points he raises I should like to touch, but I am sure he will readily understand that in a Paper read in the period of one hour one can but "merely touch the fringe" of almost any subject.

With regard both to the width of roads and the administrative departments of works, whilst naturally one is influenced by the ideal conditions at Port Sunlight, I was also speaking from experience gained in a wider field of commercial undertaking, and referred to works certainly not erected in populous districts. As to social clubs and institutes, I have found that in most cases these have been of the greatest advantage to the employees, who make constant use of these facilities.

Patent floorings for factories I have not so far found particularly useful, or of any great advantage over some of the usual forms—which apparently I need hardly have referred to.

In dealing with the subject of roofs, again I could do no more than outline general forms : to supplement these would have been quite possible, and then I might have described many other and cheaper methods of roof framing and coverings.

On the question of the section of tie-member to steel roofs, I note that I made use of the word "flat," meaning "light" steel members, but even the ordinary T or H section tie-beam is not sufficient to steady these principals of large spans where carrying shafting—upon which subject that part of my Paper was dealing.

I agree with Mr. Fraser that the subject of fire protection requires a special Paper, but he is wrong in supposing that I advocated sprinklers solely, as he will notice that in the latter part of my Paper I spoke of hydrants, and other appliances.

I note that Mr. Fraser does not consider that there are many engine-houses in this country that are made the showroom of the factory ; some day, perhaps, I may have the pleasure of showing him through a large number of engine-houses in the Midlands which certainly reach the level of showrooms.

As regards firebricks for boiler settings, it will be generally found that locality plays such a large part in the selection of these bricks that any general information would be of only local interest.

Mr. Fraser states that the subject of Factory Buildings is one about which very little has been written, and this is certainly the case ; therefore, generally it is experience and contact with these undertakings that chiefly guide one in this class of work.

REVIEWS.

HINDU ARCHITECTURE.

The Ancient and Mediæval Architecture of India: a Study of Indo-Aryan Civilisation. By E. B. Havell, author of "Indian Sculpture and Painting," "Indian Architecture," etc. With 176 illustrations and map. 4o. Lond. 1915. *30s. net.* [*John Murray, Albemarle Street.*]

It is not surprising that the task of reviewing Mr. Havell's latest book should have been considered somewhat outside the range of the average professional architect. The Preface and Introduction are devoted mainly to current Indian politics, discussing among other matters "the soundness of the historical basis upon which the statecraft of the British Raj is built"; and a large part of the book is filled by the elaboration of theories about Indian religion, history, and social development which have little obvious concern with architecture, and must be wholly unintelligible to professional architects who take no interest in the problems of Indian politics and religion, although ready to examine a clear statement of the facts and principles of Hindu architecture. So it happens that I have been asked to notice Mr. Havell's book, my life for more than forty years having been dedicated to the study of Indian subjects, both on the spot and in Europe.

The author's method of treatment invites argument and contradiction at almost every page. He is convinced that nearly everybody else is wrong, and is quite free from doubt as to the soundness of his own views. This Journal is not the place for discussing Mr. Havell's notions about Indian despotism, the history of Buddhism, the constitution of village communities, and other non-architectural topics which occupy so large a space in his book. It must suffice to say that there is reason to believe that his opinions in many cases are mistaken, and that it would be easy to criticise them destructively. One particularly aggressive paragraph may be quoted.

"Indo-Aryan art," Mr. Havell observes, "was Greek because it was born of the common parent of European and Indian civilisation. Greek art remained a child always, with childish dreams of life and beauty. Let us ever cherish those dreams of childhood which belong to the springtide of humanity. But the art of India grew to maturity and put away childish things. The art of Gandhara [*scil.*, the well-known Græco-Buddhist sculptures from Peshawar] was her plaything as a child."

Mr. Havell's books all produce on me the impression of glorified pamphlets, written to further certain views or purposes with reference to current controversies, and consequently disfigured by needlessly provocative passages like that quoted. Although the manner of the books suggests the idea of a pamphlet, they exhibit deep knowledge of Indian art, contain pages of real eloquence, and are invariably magnificently illustrated by well-chosen and well-executed plates and figures. Readers who may be offended by the text may always be assured of both pleasure and profit from study of the illustrations.

I shall confine my remarks to architecture only. The book now reviewed, it should be noted, is not a work altogether independent. It is "supplementary to *Indian Architecture: its Psychology, Structure, and History*, which dealt with the Muhammadan and British periods," and was published in 1913. The earlier book is more likely to interest European architects than the new volume, which treats of the ancient pre-Muhammadan Hindu buildings. Practically those extant are all temples or religious edifices of one sort or another. Those buildings, while always extremely curious and original, and often beautiful, are so utterly remote in purpose, feeling, plan, and decoration from European monuments in any style that they cannot well offer suggestions for the guidance of an architectural student outside of India. The Muhammadan edifices which form the main subject of the earlier book appeal much more forcibly to European professional sympathy. Domes and pointed arches are no strangers west of Suez, whereas distinctively Hindu forms seem so outlandish that they leave European students cold, as a rule. Few people can share fully the ardent enthusiasm of Mr. Havell, who is more Indian than the Indians, or even the more chastened admiration of Fergusson, who was the first to prove the right of Hindu architecture to claim serious study on its merits as a noble branch of art, which it is.

The author is right in affirming that Fergusson's classification of Buddhist, Jain, and Hindu temples as representing different epochs of art or different schools of artistic expression is entirely fallacious. The criticism, although true, is not new. Bühler many years ago pointed out that all the indigenous Indian religions use the same symbols, and to a large extent the same architectural forms. It is a mistake to speak of "Buddhist railings," to suppose that *stûpas*, or domed cupolas for the enshrinement of relics or for marking sacred spots, are solely Buddhist, and so forth. I may, perhaps, without undue egotism, quote the remarks on the subject in my *History of Fine Art in India and Ceylon*, published in 1911:—

"But, although all Indian art is religious, it is a mistake to suppose that style was dependent on creed. Fergusson's classical *History of Indian Architecture* is grievously marred by the erroneous assumption that distinct Buddhist, Jain, and Hindu styles existed. Style, which M. Le Bon regards as an affair of race, is more conveniently considered as a function of time and space, varying according to the date and locality of the work. There is no such thing, for example, as a Jain style of architecture. The *stûpas* of the Jains were indistinguishable in form from those of the Buddhists, and a Jain curvilinear steeple is identical in outline with that of a Brahmanical temple. Works of art, including architecture, should be classified with regard to their age and geographical position, not according to the creed for the service of which they were designed."

That passage, I venture to think, lays down a sound principle for the classification of styles, whether in India or elsewhere.

Mr. Havell is rather impatient of the discussion of local or chronological styles or schools. Such discussion is to him anathema, as being merely "archæological." He concerns himself almost exclusively with the supposed symbolism of Hindu architecture, for which very slight evidence is offered, and loves to give his fancy free play in interpreting the forms of buildings as being full of poetical and philosophical symbolism. "India," he declares, "has never known any style that can be called architectural but one—and that is Indo-Aryan." The name so given implies a disputable ethnological theory, or rather a series of theories. He treats all his own subjective interpretations as proved facts, although they are naturally much less convincing to other people than they are to his poetic imagination.

Mr. Havell sees symbolism everywhere. It was the practice in ancient India to surround a sacred monument or object with a stone railing, which served the commonplace purposes of a fence, and was also supposed to keep away evil spirits. The early plain examples are simply copies of an ordinary wooden post and rails. Some have only three bars or rails, others which the builder made higher have four rails. But to our author the difference between three rails and four is a matter of deep philosophy.

"The three bars of the rail," he tells us, "meant the three positions of the sun, at its rising, at its zenith, and at its setting—and hence a spiritual defence, for these three were the three times of daily prayer—only the Buddhists called them Buddha, Sangha [the Order of Monks], and Dharma [the Law of Duty], instead of Brahma, Vishnu, and Siva, according to the orthodox Brahman formula. Four bars to the Brahman meant the four Vedas, the depository of the sacred traditions of the Aryan race; the Buddhists explained them as the four events in the life of the Blessed One—the Nativity, the Enlightenment, the First Sermon at Benares, and his Death, or Pari-Nirvana."

How can Mr. Havell possibly have learned all this esoteric lore, and where is the proof of his assertions? The book does not supply the answers to the questions, and I do not know where to find them if they exist. Similar queries are constantly suggested by many passages. Authority for assertions is given very sparingly.

As a matter of fact, India exhibits examples of many different styles of Hindu architecture, although, of course, all of them have much in common. Those styles vary both locally, from province to province, and chronologically, from age to age. Any author who wishes to make the subject of Hindu architecture intelligible must classify the different forms or styles of building and give them names. Fergusson made the attempt to do so some forty years ago with so much success that his nomenclature has been generally adopted. But, being a pioneer, he naturally made mistakes, of which the most serious has been commented on above. He noticed that Indian temples obviously fall into two main classes. One, which he called Indo-Aryan, prevails in Northern India and is characterised by the bulging steeple with curvilinear vertical ribs. The other, which he called Dravidian, prevails in the peninsula to the south of the Nerbudda river, and is characterised by a straight-lined tower divided into stories by horizontal bands, and surmounted by either a barrel-roofed ridge or a small dome. Nobody can fail to recognise the obvious differences between the two classes of buildings, and it is certain that examples of one class very rarely intrude into the province of the other. The distinction consequently affords a convenient and reasonable mode of classification in accordance with undisputed facts. The name Dravidian, when understood in a territorial sense as equivalent to South Indian, is unobjectionable, but the name Indo-Aryan is open to criticism as implying controversial theories. It would be better to substitute for it the non-committal term Northern or North Indian.

Mr. Havell, while unable to deny the patent fact that the "vertical" form belongs almost exclusively to Northern, and the "horizontal" form to Southern India, refuses to regard the distinction as one of style. Both forms according to him are "Indo-Aryan," and differ only in their symbolism, the "vertical" form expressing the idea of the Deity conceived as the beneficent, protecting Vishnu, and the "horizontal" form expressing the idea of the Deity conceived as the terrible, destroying Siva. He thinks that the geographical distribution of the two forms is accounted for by the alleged preference for Vishnu worship in the North and for Siva worship in the South. He goes on to say: "As a 'Vishnu' shrine may be Buddhist, so it may also be Saivaite, for Siva to Saivaites is Brahmâ, Vishnu, and Siva. It is the image for which the shrine is built which determines the form of the latter." The doctrine is not easy to grasp, and certainly fails to afford a basis for the convenient classification and study of the actual buildings. It is, moreover, founded on various disputable and unproved assumptions which cannot be discussed here. It is impossible to study scientifically, that is to say, systematically and accurately, the architecture of a vast country, including remains extending over more than two thousand years, without the help of a simple classification and manageable nomenclature. While we may recognise that an Early English church exhibits much the same symbolism as a Perpendicular one, we need to distinguish the two buildings as diverse architectural forms, and similar necessity is felt in discussing the architecture of any country. In India, both the Northern and the Southern styles have each many subdivisions, while intermediate forms also exist. It is impossible to go into details here, but I may note that M. Jouveau-Dubreuil in his valuable work, entitled *Archéologie du Sud de l'Inde* (Paris, 1914), distinguishes five sub-styles in a portion of the peninsula, namely, Pallava, Chola, Pândya, Bijanagar, and Madura. Similar subdivision is necessary in the North.

Only one more topic can be briefly noticed. Mr. Havell holds that Indo-Muhammedan architecture is essentially a continuous development of Hindu craftsmanship, and that it must not be regarded as being in the main a foreign importation. He goes so far as to assert that in India "neither the political nor religious leaders of Islâm showed any bias towards foreign architectural fashions"; and again that: "Indo-Muhammedan architecture belonged root and branch to India's own tree." "It is, I think, quite certain," he observes, "that the Persian or Tartar 'bulbous' dome derives from the Indian Buddhist domed canopy and shrine." That view, in my judgment, is erroneous. The history of the dome in Persia and India has been investigated lately by several capable authors, and the Persian filiation of the Indian forms has been clearly established. The most recent of those authors, Mr. K. A. C. Cresswell (*Asiatic Review*, November 1914, and elsewhere), has traced conclusively the history of the Indo-Muhammedan double dome back to the buildings of Timûr (Tamerlane) in Samarkand (*circa* A.D. 1400). But, although that is true, it is also true that the Indian edifices have at least three peculiarities of Hindu origin, namely: (1) the form of the pinnacles in many cases; (2) the inverted lotus which crowns the Tâj and certain other buildings; and (3) the plan, with four smaller chambers grouped round one central dome chamber. That plan is to be seen in the mausoleums of Humâyûn and Khân Khânân as well as at the Tâj.

Although many of Mr. Havell's opinions appear to me to be erroneous, I desire to acknowledge freely that his books are of high value, because they have forced critics to recognise, somewhat against the grain, that Indian artists in architecture, painting, and sculpture have done great things. However much one may disagree with Mr. Havell, his vigorous eloquence compels thought and forbids an indolent acquiescence in the formulas of earlier writers. The prophet of a new doctrine must needs exalt his mission, and consuming enthusiasm cannot well avoid a certain amount of aggressiveness in manner and extravagance in expression.

VINCENT A. SMITH.

TWO PANELLED ROOMS.

Victoria and Albert Museum: Department of Woodwork. The Panelled Rooms: I. The Bromley Room; II. The Clifford's Inn Room. In separate volumes. 6d. each.

There have recently been issued from the Victoria and Albert Museum, Department of Woodwork, two small quarto booklets, which are admirable examples, both in themselves and in what they illustrate, of how an art museum can be really "educational" (dread word!). These deal respectively with the two Panelled Rooms: I. *The Bromley Room*, and II. *The Clifford's Inn Room*. Each book contains a concise history of the room, giving dates and all that is known as to its ownership; a faithful description of its condition at the time of removal, and a complete bibliography of works from which information has been or may be derived. Each also is fully illustrated by photographs and measured drawings. One may, perhaps, regret that these last are to so small a scale; but such criticism is impossible when one finds that the price of the book, in very neat boards, is sixpence.

Whilst each book is independently valuable their comparison is extremely interesting, for one illustrates almost the end of the older system of domestic treatment, the other the complete change of system before the expiration of the same century; and both are fine examples. In Bromley House we have the old method of panelling, a method founded originally on making the panel no wider than the plank from which it was cut. Already Italian influence is evident in all the detail, but "proportion" had not been studied as it was by the Italians and by their later English followers. This is very striking in placing side by side the two general views (frontispieces). In the Bromley example the pilasters do little to express the height; the division of the panels is regardless of proportion. On the other hand, in the Clifford's Inn Room, one sees at a glance that proportion has become the first consideration. The architect is there; he has come into existence and has perceived that "classic" architecture demands proportion. The panels are now "glued-up" to such width as may serve his purpose; and his bold bolection mouldings (possible with improved tools) give well-defined vertical lines. The result is that the room, only 9 feet 10 inches high, has a dignity of its own.

This same room, however, exemplifies the introduction of a peculiarly English vice, that of applied carving, which came about through designing stone forms for woodwork, and which is an undoubted weakness—one which has had much to answer for in later times. Where, in this Bromley Room, the carver had to deal with the mouldings, large or small, he showed, as in other examples of the Wren period, remarkable talent for preserving the sections, or even expressing them. But the *applied* carving, often beautiful in itself, was, after all, a *stuck-on* addition.

To go back to the earlier example, the Bromley Room. It is worth while to look carefully at the heraldic centre panel of the overmantel of the fine chimney-piece. This is a particularly good example of the decorative treatment of Heraldry: the space well filled, the parts well balanced, the animal supporters vigorous and stark.

But perhaps the greatest value of these books is to bring home to those whom it may concern the educative advantage of producing a *whole*, instead of scattered fragments, for exhibition. Even the untrained can acquire more correct artistic and historical knowledge in ten minutes in one of these rooms than he could learn in ten weeks wandering among fragmentary samples. It should be the aim of such museums to show not scattered examples of detail, but their practical application in conditions as like as may be to those for which they were originally wrought. The books are beautifully printed, and are probably the best sixpennyworth that ever found their way to the Library shelves.

J. D. CRACE [*Hon. A.*]

INDIVIDUALITY.

Individuality. By C. F. A. Voysey. 8*o. Lond.* 1915. 3*s.* 6*d. net.* [*Chapman & Hall.*]

"Out of the fulness of the heart, the tongue speaks." This is a book not merely for the architect, but for all who find the world too much upon them. "I have written these chapters in the earnest hope of encouraging my fellow-men to believe and feel the creative spirit within each and every one, which—while stimulating thought—leads on to mutual sympathy and true union." So runs the preface. In these chapters the case for individualism is presented and earnestly advocated, liberty for each man to work out his own salvation according to the capability that may be in him, and this Mr. Voysey maintains is omnipresent but sadly obstructed by the collectivism and materialism of the age. One chapter is devoted to the practical application of ethical ideas. It is impossible not to be touched by such sincere pleading, and almost one is persuaded that the individualist needs this defence. But does he? Has he not—let us confine ourselves to architecture—been having it all his own way these 500 years or so gone past? And in the remoter ages, was not his appearance the symptom of the beginnings of decay? Greek architecture had reached its zenith when the name of Pheidias is proclaimed. Byzantine art progresses no further after the day of Anthemius of Tralles. In Gothic architecture we see the same causes producing the same result. In the thirteenth century the Guilds worked as a corporate body. In the fourteenth they gradually generated specialists; there emerges the carver, the tomb-maker, the sculptor, the metal-founder, the artist in stained glass—and the heyday of Gothic vigour and progress is over. Mr. Voysey has no good word to say of the Renaissance—where the individual is in excelsis—and indeed ever since the time of Brunelleschi the famous buildings in Europe bear the name of their creators. And the atrophy of the Renaissance is due to the prominence of individualism. It started with a great guild tradition behind it, which it gradually crushed out of existence, and it became stiffer and more frozen as the communal element got eliminated. In Sir Christopher Wren's time there was no lack of individuality in the minor parts of his design—individuality of the craftsman—but when we reach Dean Aldrich we have reached exhaustion. The predominant individual drained its vitality.

This, Mr. Voysey would claim, is the abuse of individualism; but it seems to be the inevitable result. Titian and Michaelangelo left nothing to follow—individual art, in their directions, had reached its culmination—the individual, standing alone, produces effects that are sporadic and sterile. It is when he is backed up by fellow-workers, with a body of opinion behind him, that he succeeds in creating vital art. The Gothic revivalists had the awakened Church and the national conscience behind them, giving life to the works of the architects of the mid-nineteenth century. The Pre-Raphaelites were a group: Morris, Philip Webb, and Burne-Jones were a triad: their force was due in great measure to association. Collectivism, as I understand it, is not incompatible with individual effort: its attempted restrictions are incessantly challenged and rebelled against, it generates individual activity and resistance, and, to some degree, clears the ground for such action. We need never fear for the individual becoming extinct.

It is easy to exclaim against the materialism of the age—not so easy to be fair towards it. The last century saw a phenomenal outburst of scientific knowledge and mechanical energy. With the violence of inexperienced youth, Science insisted on flinging open the doors of the shrines containing our most sacred ideals, and demonstrating that there were no idols therein. All that could not yield to the logic of the laboratory was pronounced non-existent or relegated to the land of dreams, and these stalwarts had to be met on their own ground. They were individuals with a vengeance, pulling out the lynch-pins of the social fabric, crying "the truth, we will have the truth, though the heavens fall." In an age of doubt and perplexity it is something to have hard facts and mechanical theories to go upon, and the science of political economy—with the element of human nature left out of it—had a kind of mathematical completeness, grateful in the welter of disintegrated opinion. Out of this wreckage rose Pity, and the earnest desire to put our house in human order so far as we could understand. Hospitals were enlarged, schools were built on every hand: there shall be no sick but the incurable, no one shall enter on life neglectedly ignorant. Picture galleries and museums shall collect and exhibit to rich and poor alike the masterpieces that have been created in all ages and in all countries, libraries shall open the world of thought to whoever may choose to consult them. When the assessment of the nineteenth century comes to be made, I believe the humanity on the one side of the balance will outweigh the materialism collected for the other.

Mr. Voysey will say that all this is compatible with his plea for a greater scope and tolerance for individuality, and the question must be referred to the readers of his book—it is a book that should be read as a valuable contribution to the literature of social ethics—as to where the answer should lie.

HALSEY RICARDO [*F.*]

Books Received.

Valuations. A Text-book on Valuation applied to the Sale and Purchase of Freehold, Lifehold, Copyhold, and Leasehold Property, Assessments under Finance Act, 1910, Enfranchisement of Copyhold Estate, Assessments for Rating Purposes, Compensation on Compulsory Purchase, and Valuations for Advances on Mortgage. By Samuel Skrimshire, F.S.I. With nearly 200 fully worked examples. 8*o. Lond.* 1915. 10*s.* 6*d.* net. [E. and F. N. Spon, Ltd., 57 Haymarket, S.W.]

Fire Tests with Glass. Nos. 197 and 198 of the "Red Books" of the British Fire Prevention Committee. Reports of Tests with Three Window Openings filled in with Wired Glass. 2 Reports. 2*s.* 6*d.* each. [British Fire Prevention Committee, 8 Waterloo Place, Pall Mall.]

9 CONDUIT STREET, LONDON, W., *8th May* 1915.

CHRONICLE.

R.I.B.A. Record of Honour: Tenth List.*

Killed in Action.

LOWES, ALBERT EDWARD [*Associate*, elected Jan. 1914], A.S.C. attached to the 6th Northumberland Fusiliers, reported killed in action on 26th April.

Mr. Lowes, who was twenty-seven years of age, served his articles with Mr. Holford, of Newcastle-upon-Tyne, and was afterwards with Messrs. Marshall & Tweedie, of that city, and later with Messrs. Bradshaw Gass & Hope. He was a draughtsman of exceptional ability, and was awarded the Glover Travelling Studentship in 1912.

Died on Service.

HOYLE, WILFRED [*Associate*, elected 1910], invalided home, suffering from shock and pneumonia, after four months in the trenches with the British Army in France. Died in Netley Hospital.

Mr. Hoyle began his architectural training at King's College, Division of Architecture, and was afterwards an improver with Messrs. Stratton & Lucas. From 1906–10 he was in the office of Mr. Geoffry Lucas, the latter part of the time as chief assistant. Later, until he joined the Army, he was with Mr. C. E. Mallows.

Wounded in Action.

BROAD, KENNETH S. [*Associate*], 2nd Lieut. 2nd Leinster Regiment, reported wounded in the casualty lists of the Expeditionary Force in France, under date 24th April.

On War Service.

The following is the Tenth List of Members, Licentiates, and Students on War Service, the total to date being 41 Fellows, 254 Associates, 101 Licentiates, 1 Hon. Associate, and 137 Students:

FELLOWS.

Corbett, A. E.: 2nd Lieut., 11th Bn. Border Regt.
Knowles, W. H.: Captain, 1st Northumberland Bde., R.F.A.
Nobbs, Percy E.: Captain, 17th Northumberland Fusiliers.
Summerhayes, E.: Major, Camp Commandant, Commonwealth Military Forces, Rottnest, W.A.

ASSOCIATES.

Barry, F. Renton, jun.: 2/5 Bn. East Surrey Regt.
Carter, W. A. T.: Hants (T.) R.E.
Cheston, J. A.: H.A.C.
Dawson, N. J.: Captain, 1st Mtd. Div. A.S.C.
Douglas, A. Houston: H.A.C.
Earle, Frank: Captain, Staff R.E. Services.
Harvey, D.: R.A.M.C. (T.).
Hughes, T. Harold: 2nd Lieut., Artists' Rifles.
Mann, H. W.: Sergt., Essex Yeomanry.
Pilling, P. C.: Captain, Loyal North Lancs. (T.).
Procter, John C.: 2nd Lieut., 13th Gloucestershire Regt.
Tyrwhitt, Thomas: R.N.A.S.

LICENTIATE.

Beattie-Brown, Wm.: 2nd Lieut., 17th Bn. Northumberland Fusiliers.

STUDENTS.

Dixon, C. B.: Lieut., 13th Bn. York and Lancs. Regt.
Hamilton, T. C.: 2nd Lieut., 23rd Northumberland Fusiliers.
Kay, Mitchell C.: London Scottish.
Lyne, Edgar, jun.: R.N.A.S.

* Previous Lists will be found in the JOURNAL for 26 Sept., 17 Oct., 7 Nov., 21 Nov., 9 Jan., 23 Jan., 6 March, 3 April, and 24 April.

The Architectural Profession and the War.

The President, Mr. ERNEST NEWTON, A.R.A., in bringing to a close the discussion* on the Annual Report last Monday, referred to the statement in the Report that over 1,200 members of the architectural profession were now embodied in the various branches of the Services, and said:

I do not know if this includes all those who are of military age; but if not, if there are any who are hesitating, let them hesitate no longer. Well, gentlemen, this is a grand record, and we are very proud of these young men, gently nurtured and following a peaceful profession, who, without a moment's hesitation, have thrown aside all thought of personal comfort, all thought of their future career, and have gone out to fight in the most terrible war that the world has ever known. We cannot think too highly of these men. We are apt to take these things as a matter of course and say, "Twelve hundred of our fellows have gone"; but it means so much, and, personally, I cannot speak of it without the deepest emotion. I think it will interest you to know that of the students of the Royal Academy Schools no fewer than 84 per cent. have gone. I cannot give you the history of the few that are left, whether they are too young or not I do not know; but it practically comes to this, that at the Academy Schools there are no architectural students left. In connection with recruiting, the Architectural Association have done splendid work; their activities in this direction have deprived them of their President and practically all their students, and although they are gallantly continuing their school for students under military age, Tufton Street has become a Recruiting Centre rather than a School of Architecture. It has been suggested in more than one quarter that the names of those who have become soldiers and sailors should be permanently recorded in this building, and definite proposals will be placed before the Council in order that this may be done. The Editor of the JOURNAL, Mr. Northover, has taken great pains to compile a complete and correct list, and he hopes that anyone who is aware of omissions or inaccuracies will communicate with him at once. I should like to say in this respect that we want the

* To be published in the next issue.

names of all who are serving, whether they are assistants, or pupils, or practising architects—not necessarily members of this Institute, or of any Society at all. If all architects, or architect-students, will send their names to Mr. Northover he will know how to deal with them. I think we shall find, if everybody takes that trouble, that instead of 1,200 we shall have 1,500 or 1,600 names.

It is unnecessary to say that our young men have not gone to fight so that we old ones can carry on our "business as usual" in peace and security. Unquestionably there are difficult times before us, and we who are too old to fight will have other burdens laid upon us, from which we shall not shrink. We must do what we can to stick together and help one another. And in this connection I would appeal to all those who can do so to contribute, without delay, to the War Relief Fund so ably administered by the Architects' Benevolent Society and members of the War Committee. Of course, I know that work has dwindled practically to nothing in many offices; but, on the other hand, the War has brought a good deal of extra work to some men, and there are others whose work has been done in happier times. It is to these especially that I appeal to give as liberally as they possibly can to this War Fund.

I cannot conclude without a reference to the work of some of the Committees recorded in the Report. Where everyone has worked so hard and so loyally, it is difficult to discriminate; but I feel I must be allowed to make a brief reference to the work of the War Committees. Both have had their share of hard work, but by the force of circumstances the Professional Employment Committee has been able to show most results. On these Committees we have had not only our own members, but members of the Society of Architects, and architects attached to no Society, and they have done most useful and constructive work. They have helped a considerable number of architects already; and there is a scheme on foot which will help a good many more, and if it is not too late perhaps Mr. Lanchester would give us a few remarks in connection with it. It will help many architects who are really in distress on account of the War. Mr. Lanchester, Mr. Tubbs, and Mr. Dircks will forgive me for mentioning their names as specially devoted workers. If I were to give you a list of all the members of these committees and sub-committees whom I could single out as devoted workers I should keep you here for a very long time.

In conclusion, I also wish to thank the Council for their loyal support during what has been an abnormal and, in some ways, a difficult year. And, although I know he would prefer not to be mentioned, I cannot resist expressing my thanks to Mr. MacAlister, who works so unobtrusively that until one becomes President one does not realise how much the Institute owes to him. And this keen devotion to the interests of the Institute shown by Mr. MacAlister finds an echo in all members of the staff.

The War: Civic Survey Work for Architects.

Mr. H. V. LANCHESTER, in response to the President's invitation at the Annual General Meeting, gave some account of the steps being taken by the Professional Employment Sub-Committee of the Architects' War Committee to set on foot Civic Survey work as a measure of relief for architects whose ordinary work is suspended owing to the War.

Mr. Lanchester said that when, as a member of the Professional Employment Sub-Committee, he made enquiries, he found that there was great need of a form of employment suited to architects which would produce some useful work that would be of recognised value after the War. The Committee came to the conclusion that one of the best forms of employment was to help to replace the collection of Civic Survey drawings which was lost on its way to India in the *Clan Grant* owing to the sinking of the vessel by the *Emden*. The work interested the Committee so much that they realised the possibilities of Civic Survey work throughout the country as a valuable preparation—and one which had been maintained by eminent authorities as an indispensable preparation—for town-planning schemes. It was realised that there was an opportunity here for architects to engage in this class of work as a preparation for the town planning of the future. The Committee, on their own account, and out of their own funds, began to employ those who were in need. But it soon became apparent that the work was beyond the scope of any funds which they could hope to have at their disposal. They therefore approached the Government—and members would appreciate the slowness of the operation of moving a Government—and after many discussions and interviews the Government was persuaded to make a grant, though only a small one. It was a grant for work by professional men in difficulties, and for this work £2 a week was offered, just to tide them over the present difficult period. Two conditions the Government attached to its offer—namely, that the work should be in the hands of competent directors, and that the approval of the local authorities concerned should be obtained. The last condition was rather a difficult one, because in some places a number of different local authorities had to be approached and convinced. But they had seen the Secretary of the Government Committee, and he encouraged them to hope that if they could get the approbation of some of the large central societies representative of local authorities, such as for Greater London, for Birmingham and district, and other districts, that would satisfy the Government requirements in this regard. In that way they would be able to cover a large area at one stroke. Through Mr. Aldridge, who was holding conferences of these societies, the Committee had obtained general approval from that representing Greater London, so that as soon as they could get their organisation together they would be able to ask the Government to help them by making the grant above alluded to. Though only a small grant, they hoped it

would be of assistance to those who were really in straits. He thought this was satisfactory, and that the Committee had set on foot a valuable work. But they need not stop there; they might go on and try to extend the scope of work of this class. But so far they had the recognition of the Government that architects were entitled to be considered, especially owing to the necessity which the Government had been under of stopping building works.

American Feeling on the War.

Mr. Clipston Sturgis, President of the American Institute of Architects, in a recent letter to the President R.I.B.A., writes:—

"Our hearts are with you in the splendid struggle England is making, and the example she is putting before the world of that fine courage which is the outcome of a conviction of the right."

The late Philip Webb.

At the General Meeting of the Institute last Monday, before the ordinary business of the evening was proceeded with, a resolution was passed expressing the Institute's deep regret at the loss the profession has suffered by the death of Mr. Philip Webb, and eloquent tribute was paid by various speakers to the character and genius of the late architect.

Mr. E. Guy Dawber, *Hon. Secretary*, said: I am sure all our members will have noticed in the papers a fortnight ago the report of the death of a great architect, Mr. Philip Webb. Though Mr. Webb was not a member of our Institute, we all of us have a very great admiration for his work as an architect. He was a pioneer in the early days, and he has left a great mark upon English architecture. I beg to propose the following resolution:

> "That the Royal Institute of British Architects desires to express its deep regret at the death of Mr. Philip Webb, and to record its high appreciation of his distinguished career, and admiration for his artistic achievements in architecture and decoration."

The President: I will ask Professor Lethaby to second that resolution.

Professor W. R. Lethaby [*F.*]: It is very difficult for me to do so, Sir, because Mr. Philip Webb was one whom I looked on with what may seem extravagant admiration. Of course he lived latterly, indeed throughout all his career, so quietly that we know little about him. But, to my own mind, he was a great force, and also that somewhat astonishing thing, a great man—in fact, with one exception, the greatest man I have ever had the chance or fortune to come into contact with in any way. When the attempts in English building in the last half-century come to be analysed, I think it will be found in an extraordinary degree how Philip Webb at once, in the early days, in his first works, when he was twenty-eight, twenty-nine, or thirty years of age, did the same sort of work which he did towards the end of his long life; and that he set the pattern for what became the ambition in building in the latter end of the nineteenth century. As Mr. Mackail well knows, he foredid everything which was done by everybody else. The red-brick house, the treatment of the sash-window, the attempt to deal with modern practical requirements in a modern and—if one may use that dreadful word—"artistic" way, all seemed his inventions. And in detail, if one traces it right up—in a more or less archæological manner—you find that he anticipated everything which came to be done later—and not only so in architecture, but in the decorative arts. In fact, all that the Arts and Crafts people tried to do appears to have been handled by Webb twenty or thirty years before they made that effort. And not only was he a great building architect and a great decorative architect, but he was a most wonderfully gifted draughtsman, especially of animal forms. He was a sort of born lover of animals, and was led by his nature into drawing them in a very sympathetic and wonderful way: so that, within the limitations of his output, he was one of the great animal draughtsmen of his time in England. I wish I could give you some picture of his remarkable gifts and attainments. It partly hinged on the time of his birth; he was born into a great enthusiasm, in the early middle period of the nineteenth century, when he fell in with a group of gifted men who, in an extraordinary way, became one-minded, so that we cannot tell where the work of one man began and the work of another finished; the work of Webb, Morris, and Burne-Jones was so interweaved. That is one little point perhaps that might have a general application; it is the need we must all feel for closer association, the need of groups for sympathy and co-operation, for stimulating one another on in our hard career.

Mr. J. W. Mackail, LL.D.: I feel under a great obligation to your President for the courtesy with which he has allowed me, though not a member of the Institute nor an architect, to add a few words from perhaps a rather different point of view to those which have been already so well spoken by those who are qualified, as I am not, to speak of Philip Webb's work and genius as an architect. But it so happens that, though I cannot say I was one of Webb's intimate friends, and indeed saw very little of him, yet I have moved for many years in the closest intimacy with those who were his closest friends and whose lives I have helped to chronicle. And from that knowledge, together with the personal knowledge that I was fortunate enough to have of Webb himself, it is possible not only to agree in the fullest way with what has fallen from those who have spoken already, but to emphasise, as I hope I may be allowed to do, some of the remarkable qualities of character which Webb possessed. It is not only that he was a great man, and also, as Professor Lethaby has said, a great pioneer: but his pioneer work was executed during his earlier and more fertile period in closest brotherhood

and co-operation with other men of equal greatness with his own. When one goes back more than half a century and thinks of Street's office, in which Webb was succeeded as senior assistant by Norman Shaw, and in which for a time William Morris was a junior assistant, one is full of amazed admiration at the great achievement which came out of this single office. And then when Webb set up on his own account after leaving Street's, the first work which he did was in all respects and in the fullest sense of the word a masterpiece. His genius seems to have come into the world full-grown. That was "Red House," which he built for Morris. It was planned in the winter of 1858 and completed in the summer of 1860. As to this I need only quote the very generous and true words written of it at the time by Rossetti. He called it "A most noble work in every way, and more a poem than a house—an admirable place to live in too." We all know at least some of Webb's work. There are two houses of his in London and two out of London with which I have for many years been very intimate. What is remarkable about the impression they make upon one who is not an architect is that they produce their effect very slowly. Of this one may be certain, that never with any lapse of years does one regard them with less admiration than one did at first. It took me a dozen years to begin to appreciate one of his greatest works in architecture—"Clouds," in Wiltshire. But the effect it produces is permanent, and that effect is due to the fact of Webb's sense of proportion in design. That was impeccable. It was masked towards the wider public by a certain austerity which prevented it, and probably will prevent it, receiving any very wide popular acceptation. For just as in his own personal character he was reserved and austere, and in later years at least a good deal of a recluse, so his art possessed the same characteristics; it was austere and reserved, but it was always high, and always, within the limits which he rigorously assigned to himself, perfect. Mr. Reginald Blomfield wrote twenty years ago that the nineteenth century will probably be memorable—as regards architecture he meant—as the most barren of creation in the history of the civilised world. To that sweeping assertion there are at least a few brilliant exceptions. Webb's work is one of those exceptions. That austere art at a high tension is one of the prominent gifts to our civilisation which have been bestowed upon us during the last fifty years. Webb's life was, from the beginning and until he gave up altogether, one of strenuous work, strenuous and laborious, and with a certain gravity which amounted almost to greyness. The one point upon which one would have wished his life to be different was that there should have been more joy in it. Perhaps that absence of joy reflects itself to some extent even in the work of his hands, at least in his later work. I have lived for many years, and do live at the present day, among Webb's furniture, the things that he designed and that were produced under his immediate eye in the early days of the firm of Morris & Company, and they have that sense of joy and superabundant vitality which Morris communicated through all that circle, and flushed with radiance even the cold austerity of his great colleague. And now that colleague is gone. He lived exactly in the sense of Milton's noble words, as "ever in his great Task-master's eye." Perhaps he regarded Him as a task-master more than was necessary. His friendships were few, but they were deep. Those friends whom he had, he grappled to his soul with hooks of steel, and they remained his friends for ever. In these few friendships he lived and wrought unrelaxing to a great age, and became towards the end more and more solitary in his life. And now we have to deplore the loss of the last survivor of a great circle who did much to restore and heighten civilisation in this country and in the world.

Mr. Halsey Ricardo [*F.*]: I have no pretensions to speak of Webb as a man, for I scarcely knew him. On the two or three occasions when I had to approach him he was kindly, but reserved. His work—and I know little more than his town work—has the quality of arresting one's attention, without being in the least aggressive or on parade. Its main characteristic, I find, is the vitality and life which there is in every part of it. It is full of ideas and suggestions; there is development possible from every item. Much work that is being done is charming, cultured, and full of literary feeling, and exceedingly pleasant to look upon; yet, as far as we can see, nothing is going to come out of it. Webb's work, on the other hand, was inspiring, prompting to further action and invention. This is due, I think, to his knowledge and appreciation of the materials he dealt with. He knew what had been done with them in past time, and what they were good for. His treatment of marble and stone, brick and metal bears his sign-manual, due to his investigation into the methods of the past, as well as to his practice of keeping his hands always on the material. He had a Janus attitude with respect to his construction: one face looked to the past, the other to the actual present. And always one feels the constructive common sense that appropriates what is valuable, what has been found effectual, either in the past or in the present. I once obtained from him a specification of a small work that he had been erecting. When an architect writes his own specification, it is a most illuminating document; you will see from it what manner of man he is, what he knows, what he thinks, his outlook on his work. It is a searching insight into human nature. The specification I obtained was full of wise lore and proved experience. It was human, and it made reference to some of the idiosyncrasies of the materials, asking for special care and watching over some of the items in their new resting-places. This sensitive, sympathetic attention shows itself in his works, and it is everywhere—in an iron railing, or a firegrate, or a coping, as fully as in the larger features. His work, consequently, is suggestive, and full of hints and directions as to the way one should go; complete in itself, for his work was complete to the last detail. Yet

it was far from being final; there is sap enough in it not only to keep it as a living thing, but also to engender blossom and seed to grow in such minds as can afford a suitable ground and the desire to cultivate it. And what higher praise can we give to a man's work than that besides being distinguished it is fruitful?

The resolution was then put to the Meeting and carried by members rising in their places.

Mr. PHILIP NORMAN, F.S.A., expressing regret at his inability to be present on Monday, writes:—

"If I had been called upon to say anything at the Meeting I should hardly have ventured, in the presence of a number of distinguished architects, to speak of the high quality of Philip Webb's architectural designs—of their reticence, and of an unerring sense of proportion, which is too often wanting in recent work.

"I knew him best as a member of the Committee of the Society for the Preservation of Ancient Buildings, on which I worked regularly for many years.

"Apart from my admiration for his work as an artist, what struck me most about him was his profound conscientiousness. I never in my life knew a man more absolutely resolved to do his duty. Perhaps some of his ideals will always remain ideals, but he was a man of great gifts, and he set us all a noble example."

The late Wilfred Hoyle [*A.*].

Mr. H. V. LANCHESTER, *Vice-President*, rising at the instance of the President after the speeches above recorded, said: Mr. Wilfred Hoyle, in contrast to the late eminent gentleman about whom we have just been listening, was one of the very young members of our profession. He was quite at the beginning of his career, but was a rising member of the Institute. The reason I ask you to pass a special vote of condolence with his relatives is because of the fact that his death is directly due to his work in defence of his country. Mr. Wilfred Hoyle was invalided back from the front, and his death arose from the exposure he underwent in the trenches. He had three brothers also fighting at the front, and one of these has lost his life in action. I think it would be, under the circumstances, a graceful act to offer the condolences of the Institute to his near relatives. The motion, seconded by the Hon. Secretary, was carried.

The late Alfred Samuel Goodridge [*A.*].

Mr. A. S. Goodridge, of Bath [elected Associate in 1852] died on the 17th April, at the age of eighty-seven. The Hon. Secretary, in announcing the event at last Monday's meeting, said that Mr. Goodridge was practically the father of the Institute, having been an Associate for 63 years. He was the son of an architect who was doing good work over a century ago in Bath; and he himself was responsible for some fine buildings and for many important alterations carried out in that city under his superintendence. On the motion of the Hon. Secretary, a vote of condolence was passed to the bereaved widow and family.

Mr. Mowbray A. Green [*F.*], of Bath, has kindly contributed the following particulars of the work of Messrs. Goodridge, father and son:—

Our late Associate's father, Henry Edmund Goodridge, who came of an old Devonshire family settled in Bath since the eighteenth century, was one of the pioneers of the Neo-Grec manner in the West, and executed a new Ionic façade to Argyle Chapel, Bath, in 1821; Lansdown Tower in 1825; the Cleveland Bridge and approaches in 1827; and Montebello, Bathwick Hill, in 1828, a house which remains to this day as a fine example of its period. In 1829 he erected the stone staircases and terraces at Prior Park for Bishop Baines. (A reproduction of his plans for this work and two photographs were published in the Institute JOURNAL, 1905–6, pp. 369–371.) He built the entrance to the Lansdown Cemetery, and the Corridor, Bath, in 1845; and Fiesole, Bathwick Hill, in 1846. Amongst other works of his were Combe Down Church, the Beckford Library at Hamilton Palace, Ecclescraig, the seat of Mr. Forsythe Grant, and Downside College Chapel. He also competed for the Houses of Parliament in 1836.

Alfred Samuel Goodridge was the Architect of Percy Chapel, Bath, in conjunction with his father; and amongst his other buildings were the Harding Almshouses, Moyles Court, Hants; the Fountain in Laura Place, Bath; Ravenscroft, Bathwick Hill; Trowbridge Town Hall; Highfield, Trowbridge, the residence of the late Sir Roger Browne; Lady Browne's Almshouses, Trowbridge, and the Browne Mausoleum in Trowbridge Cemetery. He also remodelled Lloyds Bank, Milsom Street, Bath. He was keenly interested in up-to-date sanitation, and during his practice the reconstruction of the drainage of a large number of houses was carried out under his supervision.

Amongst his unexecuted works were schemes for New Markets, in 1861, the remodelling of the Sydney College as an hotel, and a very large Hotel on Queen's Parade, all in Bath.

The Annual Elections: New Nominations.

The following nominations have been made by members in accordance with By-law 33:—

As Vice-Presidents.

BURNET: Sir JOHN, R.S.A. [*F.*].
Nominated by John Watson, Alexander Paterson, A.R.S.A., Sir Robert Lorimer, A.R.S.A., A. Lorne Campbell, James A. Morris, John B. Wilson, John Keppie, *Fellows*; T. Forbes Maclennan, Alex. McGibbon, *Associates*.

LUTYENS: EDWIN LANDSEER, A.R.A. [*F.*].
Nominated by Sir Aston Webb, K.C.V.O., C.B., R.A., Halsey Ricardo, John Slater, Sir Ernest George, A.R.A., Professor Beresford Pite, Professor W. R. Lethaby, Sir Charles Nicholson, Bart., *Fellows*.

WATERHOUSE: PAUL [*F.*].
Nominated by Thomas E. Collcutt, Alfred B. Yeates, Herbert Baker, Gerald C. Horsley, Sir Ernest George, A.R.A., Walter Cave, Sir Aston Webb, K.C.V.O., C.B., R.A., Edwin L. Lutyens, A.R.A., G. H. Fellowes Prynne, *Fellows*.

As Members of Council.

GARBUTT: MATT. [*F.*].
Nominated by Fred. W. Marks, Edward Greenop, E. J. Gosling, Herbert A. Satchell, Max Clarke, F. T. W. Goldsmith, *Fellows*; Sidney K. Greenslade, *Associate*.

RICKARDS: EDWIN ALFRED [*F.*].
Nominated by H. V. Lanchester, D. Barclay Niven, H. H. Wigglesworth, S. D. Adshead, A. E. Richardson, *Fellows*; Stanley C. Ramsey, C. Lovett Gill, *Associates*.

As Member of Practice Standing Committee.

HUDSON: JOHN [*F.*].
Nominated by Wm. Woodward, Alfred W. S. Cross, Frederic R. Farrow, Percy B. Tubbs, Max Clarke, *Fellows*; H. Hardwicke Langston, J. Douglas Scott, *Associates*.

The Front, No. 9 Conduit Street [*ante*, p. 309].

From Mr. J. D. CRACE, F.S.A. [*Hon. A.*]—

I should like to add my humble endorsement of the opinion expressed by "Ubique," quoted in the last issue of the JOURNAL. It is, perhaps, fortunate that financial reasons will keep any project of alteration in the background for many years. The Institute has a plain, well-proportioned, and not undignified front, businesslike, and not inviting criticism. Let us be content. A walk round the neighbourhood will hardly convince the Council that modern alterations, with architectural symptoms, have done much to improve upon the old houses, or added to the dignity of the streets and squares affected.

British Architects and Indian Craftsmen.

In the House of Commons, on Tuesday, 27th April—

Mr. KING asked the Under-Secretary for India whether his attention had been called to the account furnished by the Consulting Architect to the Government of India on the work done by Indian craftsmen on the building of the Gwalior Residency; and whether, in view of the official testimony to the fact that Indian craftsmen, when inadvertently left without full-size drawings, were able to carry out details with freedom, taste, adherence to the ideas of the British architect, and with pride and delight in their work, instructions were now being given to save the expense of full-size drawings of details of ornaments, mouldings, etc., so that office expenses might be saved and Indian master-builders and craftsmen might be encouraged in their traditional art.

Mr. CHARLES ROBERTS: The Secretary of State has noticed the paragraph in the report by the Consulting Architect to the Government of India to which the hon. member alludes. The Government of India are also, no doubt, aware of it. They have expressed their intention to give facilities to such an extent as may be found practicable for Indian sentiment to find expression in New Delhi through the medium of Indian craftsmen and builders, and the Secretary of State does not consider it necessary to issue any special instructions in the matter.

International Engineering Congress, San Francisco.

A letter addressed to the Institute by Mr. C. W. Hunt, Secretary of the above Congress, states that the American Engineering Societies have arranged for a special excursion train from New York to San Francisco in connection with the meetings of the Societies just before the Congress. The train leaves New York on September 9th, and arrives at San Francisco on the 15th, stopping *en route* at three of the most interesting scenic points in the United States—viz., Niagara Falls (4 hours), Colorado Springs (11½ hours), and the Grand Cañon of Colorado (15 hours). The fare from New York to San Francisco and return is $98.80. A cordial invitation is given to members of the R.I.B.A. to attend the Congress, and to make the journey with the special train party, which will represent all classes of engineering activity. Fuller particulars are given in a circular to be seen in the Institute Library. In order that accommodation may be provided in the special train, notice should be sent as soon as possible to Mr. Chas. Warren Hunt, Secretary to the American Society of Civil Engineers, 220 West Fifty-seventh Street, New York.

On Service in East Africa.

Mr. H. L. Geeson, *Licentiate*, serving as Lance-Corporal in the "A" Company, East African Regiment, writes from Nairobi under date 2nd April:

Most of the architects in this colony enlisted on the news of war last August, some in the above regiment, others in the Pioneers and Transport Corps, and many of us have been at the front. Five joined this regiment, three are at present serving and have been doing so from the commencement of war. Our work is varied—we have guarded important posts on the Uganda Railway which have been attacked by the Germans, have held positions on the main road from this colony to German East Africa, and have been on safaris through the bush country and over the border looking for patrol parties of the enemy. By forced marches a party of this regiment trekked across a mountain range, through swamps and thick bush, to cut off a raiding party of Germans on the Tsavo river, and we arrived in time to capture some of them, after a hard march and with a shortage of food and water. On the safaris water is very scarce and has to be carried by native porters in kerosene tins and canvas bags. All marching through the bush is done in single file and the stores are carried by porters. The heat is great, and long midday rests are necessary, marching being done by moonlight when possible. Columns are stretched out to a great length, as many as 300 porters being necessary to carry the stores for 50 white men, each boy carrying about 60 lbs. on his head. The bush is thick and often pathless, and directions are taken by the compass. Game of all sorts is met—giraffe, rhinoceros, lion, buffalo, zebra, leopards, and buck of all sorts—and one has to rely on one's rifle for meat for the next meal. At present we are in Nairobi being refitted, and being armed with Maxim guns, and expect soon to be at the front again.

Boswell's House, Great Queen Street.

The London County Council have accepted an offer of the Grand Lodge of Freemasons to present portions of the façade and the staircase of Nos. 55 and 56 Great Queen Street, known as "Boswell's House" and formerly as "Bristol House," and it has been decided to exhibit the staircase in the Geffrye Museum and to re-erect the façade in Geffrye's Garden. (An account

of this Museum, which is in Kingsland Road, Shoreditch, will be found in the JOURNAL for 11th April 1914.) It was hoped that the Grand Lodge might be induced to repair and preserve the building *in situ*, but upon detailed examination it was found that the brickwork and piers supporting the structure were decayed and cracked, that dry-rot was prevalent in the timbers of the roof, and that the front wall was out of plumb. A dangerous structure notice had been issued, and the District Surveyor was not prepared to approve of the front being incorporated into what would become, under the Grand Lodge's scheme, a public building. The house originally formed the western portion of a large mansion built in 1637, the designer being stated to be John Webb, pupil of Inigo Jones. Among the distinguished residents have been the first two Earls of Bristol; Thomas Fairfax, Cromwell's Commander-in-Chief; the 3rd Earl of Devonshire, the 2nd Earl of Sunderland, the 7th Duke of Norfolk, and James Boswell. A history of the building is given in Vol. V. of the L.C.C. Survey of London.

ARCHITECTS' BENEVOLENT SOCIETY.

Annual Report, adopted at Annual General Meeting 20th April.

The Council of the Architects' Benevolent Society, in submitting their sixty-fifth annual report, regret that they have to record a falling-off in the amount of subscriptions, as compared with last year, of £27 18*s*. As no doubt many subscribers have been affected by the War, it is feared that this diminution may be increased during the coming year, unless those who are in a position to do so assist the Society by either augmenting their subscriptions or assisting the Council to obtain new subscribers.

The sum of £1,150 15*s*. has been distributed in grants and pensions, an increase of £141 as compared with the previous year.

The Capital Account, on the other hand, has been increased. The Society in this connection is greatly indebted to the generosity of Mr. Henry L. Florence, Vice-President, who last June presented a donation to the funded property of the Society of £1,000 City of London Corporation 3½ per cent. Bonds, 1914, fully-paid scrip. For many years Mr. Florence has manifested his interest in the Society, both by active work as a member of the Council and by contributions; and the Council feel that the beneficial work of the Society could receive no greater testimony to its practical usefulness than this handsome contribution from one with so intimate a knowledge of its character and scope.

The Capital was further increased by a donation of £550 made by Mr. George Neat, acting under the discretion given to him by the will of the late Mr. Frederick Ingle, of 24 Queen Anne's Gate, S.W., and Chesterworth, Lincolnshire. A further instalment of £500 was received from the Executors of the late Mr. William Glover, making the total amount received to date from this source £1,200. The Society is also indebted to the Chelsea Arts Club for a donation of £50, and to the following donors: Mr. Balfour Abercrombie, £10 10*s*.; Mr. C. Stanley Peach, £10 10*s*.; Mr. Reginald St. A. Roumieu, £10 10*s*.; Mr. Benj. Ingelow, £10 10*s*.; Mr. W. H. Scrymgour, £10; Mr. Frank Lishman, £6 13*s*. 6*d*.; and to various donors of smaller sums.

In the Autumn the Council were informed by the Executors of the late Mrs. Arthur Cates that she had left the Society a legacy of £1,000. As this amount was not, however, received before the end of the year, it is not included in the year's Accounts.

Shortly after the Declaration of War a Committee, representative of the architectural profession as a whole, and known as the Architects' War Committee, was formed, and issued a special appeal for contributions for the relief of members of the profession or their dependants who are in distress caused by the War. In November this Committee handed over to the Society the sum of £591 19*s*. 6*d*., with the request that the sum should be administered in the relief of such cases, but that assistance need not necessarily be given only in the form of charitable doles. The Council have opened a separate account at the bank for this and any subsequent amounts that may be received from the Architects' War Committee, and are distributing grants among applicants, as well as contributing, subject to certain conditions, to the funds of the Professional Employment Committee and the London Society, both of which bodies are endeavouring to provide work for members of the profession who are in temporary difficulties in consequence of the War. At the termination of the administration of this fund a detailed account will be issued.

The following, being the five senior members, retire by rotation from the Council: Mr. E. Arden Minty, Mr. Wm. Woodward, Mr. Arthur Ashbridge, Mr. Sydney F. Bartleet, and Mr. E. Guy Dawber. To fill the vacancies caused by these retirements the Council have the pleasure to nominate Mr. W. Campbell Jones, Mr. Walter L. Spiers, Mr. Percy B. Tubbs, Mr. W. Henry White, and Mr. Edward Greenop.

The Council have again the pleasure to nominate Mr. Henry L. Florence and Mr. Reginald St. A. Roumieu as Vice-Presidents.

In concluding this report the Council earnestly hope that they may be assisted by the active co-operation of members of the architectural profession in obtaining fresh contributions, as there are indications that assistance will become a matter of greater urgency in the crisis through which the country is passing at the present time, and that the resources of the Society will be heavily taxed.

The President's Appeal.

Mr. ERNEST NEWTON, A.R.A., President of the Society, in moving the adoption of the report, said:—

"In proposing the adoption of the Report, I wish to call attention to the fact that the goal which this Society has had in view for so many years has at last been attained, and our capital has reached £20,000. I would suggest that we now aim at making it £30,000.

"It is, I am sure, quite clear to you all that large claims will be made on us on account of the War, and I fear that an *ordinary* appeal to the general body of architects will not be likely to be as successful as usual, as there is no doubt that an increasing number is suffering from lack of work. The Government's decision to divert labour from building work to other and more pressing activities will undoubtedly stop a great deal of work that is in contemplation by municipal and other authorities, and will thus extend the area of unemployment amongst architects. I would therefore appeal to the generosity of those who are, perhaps, more fortunately situated to add to our funds to the utmost of their ability. If all who are able would follow, either exactly or as nearly as they could, the generous example set last year by Mr. Florence, we should have no further anxieties. But I need not say we shall welcome all sums, large or small, and I would remind you of the old saying that 'he gives twice who gives quickly.'

"In view of the action of the Government which I have already alluded to, it may perhaps at some future date become necessary to make an appeal outside our own ranks, but it would, I think, be premature to consider this at present. I feel, and I am sure that you will agree with me, that if we can do without this wider appeal, we should all prefer it. On the whole, I am inclined to think that the best kind of appeal is a personal one. I mean that each member of the Council, by using his personal influence, will materially assist to increase our funds by a larger sum than any written or printed appeal would produce.

"Assistance by way of employment is, as you know, already being given to a large number of architects. This seems to me to be an excellent system. The aim of the Employment branch of the War Committee is to give this kind of help to architects in all parts of the United Kingdom, and I am sure that I can therefore appeal not only to London men, but to our well-to-do colleagues in every part of the country, to make a *special* response to a *special* appeal."

Mr. Newton's appeal was strongly supported by Mr. W. Hilton Nash, Hon. Treasurer, and subscriptions were forthwith received from the following gentlemen :—

Mr. Ernest Newton, A.R.A.	£5	5	0
Mr. Percivall Currey	5	5	0
Mr. W. Hilton Nash	5	5	0
Mr. H. Chatfeild Clarke	5	5	0
Mr. Henry Lovegrove	5	5	0
Mr. Albert E. Kingwell	2	2	0
Mr. C. H. Löhr	1	1	0

Sir Ernest George, A.R.A., has since sent a cheque for £10 10*s*. Prior to the meeting Sir Aston Webb presented through the President £25 to the War Fund.

ALLIED SOCIETIES.

The New Zealand Institute of Architects.

The question of the education and training of young men preparing for the architectural profession in New Zealand has been for some time before the New Zealand Institute of Architects, and it has now been decided to ask the Government for a grant for the purpose of establishing in one of the University Colleges a Degree or Certificate course in Architecture, the College to be selected by the Government. The Education Committee has in preparation a scheme of examination for the New Zealand Institute's certificate of membership.

A Fellow of the R.I.B.A., Mr. Alfred Atkins, Past President of the New Zealand Institute, has generously endowed the Institute with funds to provide for all time a silver and a bronze medal annually to be awarded in the Prize Essay Competition. He has also presented a gold medal for the Council to bestow as they see fit, and further, with the dies from which the medals may be annually struck.

MINUTES. XIII.

At the Eighty-first Annual General Meeting (being the Thirteenth Meeting of the Session 1914–15) held Monday, 3rd May 1915, at 8 p.m.—Present : Mr. Ernest Newton, A.R.A., *President*, in the Chair ; 24 Fellows (including 8 members of the Council), 13 Associates (including 3 members of the Council), 2 Licentiates, and 3 visitors—the Minutes of the Meeting held Monday, 19th April, having been published in the JOURNAL were taken as read and signed as correct.

The decease was announced of the following Associates :—Edgar George Cusson Down, elected 1896 ; Alfred Samuel Goodridge, elected 1852 ; Robert Francis Hodges, elected 1873; Wilfred Hoyle, elected 1910.

On the motion of Mr. E. Guy Dawber, *Hon. Secretary*, who referred to Mr. Goodridge's long period of membership, it was resolved that a vote of sympathy and condolence be passed to the widow and family of the late Associate.

Speeches expressive of appreciation of the character and genius of the late Mr. Philip Webb, architect, were delivered by Mr. E. Guy Dawber, *Hon. Secretary*, Professor W. R. Lethaby [*F.*], Mr. J. W. Mackail, and Mr. Halsey Ricardo [*F.*], and it was

> RESOLVED, That the Royal Institute of British Architects desires to express its deep regret at the death of Mr. Philip Webb, and do record its high appreciation of his distinguished career, and admiration of his artistic achievements in architecture and decoration.

On the motion of Mr. H. V. Lanchester, *Vice-President*, it was resolved to record on the Minutes the regrets of the Institute for the loss of its young Associate, Mr. Wilfred Hoyle, who had died at Netley Hospital from pneumonia contracted in the trenches while serving with the British Army in France.

Mr. William Weir, *Licentiate*, attending for the first time since his election, was formally admitted by the President.

The President having presented the Annual Report of the Council and moved its adoption, Mr. Wm. Woodward [*F.*] seconded the motion and briefly reviewed the Report.

In the ensuing discussion the following members took part : Messrs. G. A. T. Middleton [*A.*], A. F. Watson [*F.*], H. Hardwicke Langston [*A.*], W. H. Atkin-Berry [*F.*], H. A. Welch [*A.*], W. R. Davidge [*A.*], Matt. Garbutt [*F.*], Max Clarke [*F.*], and F. R. Farrow [*F.*]

The President having addressed the Meeting, the motion was put to the vote, and it was

> RESOLVED, unanimously, That the Report of the Council for the official year 1914–15 be approved and adopted.

The List of Attendances at Council and Committee Meetings held during the Session was laid upon the table.

Upon the motion of the President a vote of thanks was passed to the Hon. Auditors, Messrs. R. Stephen Ayling [*F.*] and H. A. Saul [*A.*] for their services in auditing the accounts.

Messrs. R. Stephen Ayling [*F.*] and A. W. Sheppard [*A.*] were nominated Auditors for the ensuing Session.

The Meeting closed at 10 p.m.